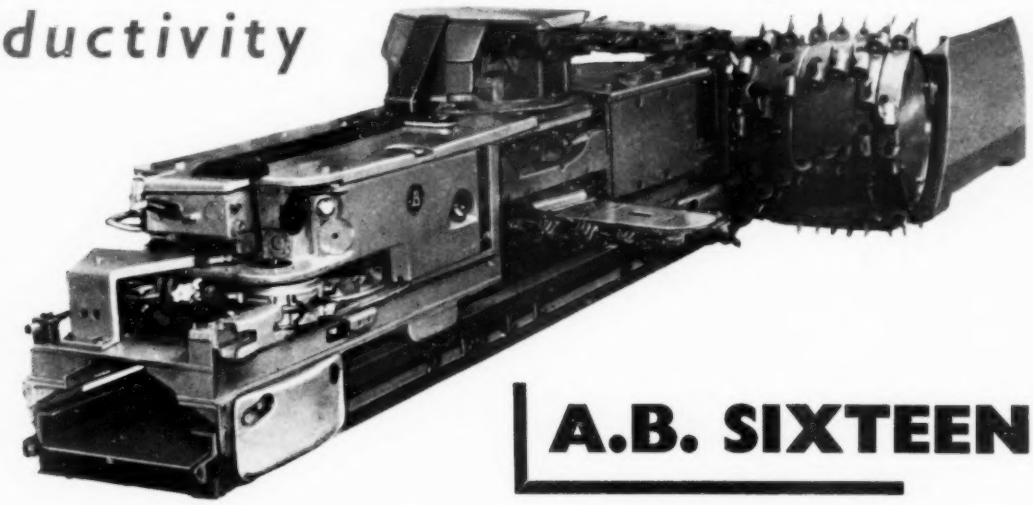
IRON & COAL

THE IRON AND COAL TRADES' REVIEW

VOL. 183 | Offices: John Adam House, 17-19, John Adam Street, London, W.C.2 | Registered as a Newspaper
No. 4,859 | LONDON: FRIDAY, SEPTEMBER 1, 1961 | Single copies 1s. (by post 1/4)
Ann. Subs.: 55s. (Abroad 60s.)

Improve Coal sizing, Output and Productivity

WITH THE



A.B. SIXTEEN

PRE-CUTTING

ANDERTON SHEARER-LOADER

Hydraulic Haulage with Auto Control. 100 or 125 h.p. continuously rated water-cooled motor.

Illustration shows version with HAULAGE END COMBINED OVERCUT AND UNDERCUT

Other arrangements available:

Undercut.
Fixed Height Overcut.
Ranging Overcut.

PIONEERS IN POWER-LOADING

ANDERSON, BOYES & CO. LTD

HEAD OFFICE: FLEMINGTON ELECTRICAL WORKS, MOTHERWELL

London Office: 25 Victoria Street, S.W.1

Branches at Gateshead, Rotherham, Cardiff and Glenrothes (Fife).

Represented througnout the coalfields of the world.

OXYGEN STEELMAKING PLANT

British Design and Manufacture

Davy-United's steel processes division is today handling contracts from individual basic oxygen converter furnaces to overall engineering layout for complete steel melting shops. Plant and equipment is fabricated and machined in the workshops of Ashmore, Benson, Pease & Company Limited, Davy-United's associate company at Stockton, where workpieces in excess of 100 tons are regularly manufactured and assembled.

Heavy machine bay in the Stockton workshops. Total floor area of the machine and fitting areas is over 160,000 sq. ft.

Steel processes division

DAVY-UNITED | **DAVY-ASHMORE GROUP**

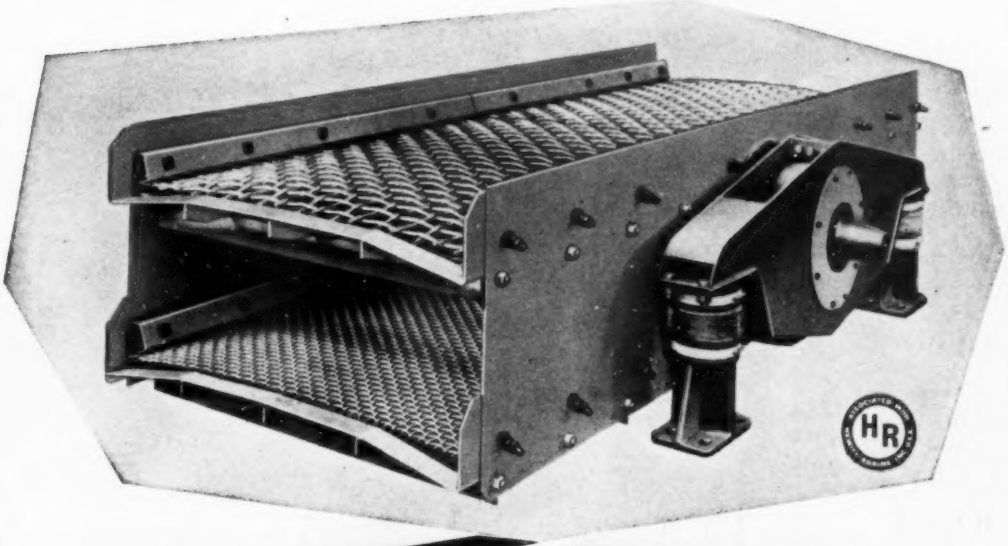
DAVY AND UNITED ENGINEERING COMPANY LIMITED . SHEFFIELD . ENGLAND

LONDON . STOCKTON . GLASGOW . MIDDLESBROUGH . HULL . PARIS . MONTREAL . MELBOURNE . SYDNEY . JOHANNESBURG . SALISBURY . CALCUTTA . BOMBAY

505

SPOTLIGHT ON BULK HANDLING EQUIPMENT

Screens



where accuracy counts-VIBREX SCREENS

These fully-floating machines have a number of exclusive design features:

* the circular-throw motion gives extreme accuracy and efficiency of segregation;
* the slope of the screen can be varied to the precise angle needed for a particular operation;
* there are only 2 lubricating points, making maintenance both easy and inexpensive.

Four distinct ranges of Vibrex Screens are available. There is also, for primary handling, the Vibrex Heavy Duty Scalper, which deals with lumps up to 4 tons each at the rate of 2000 tons an hour.

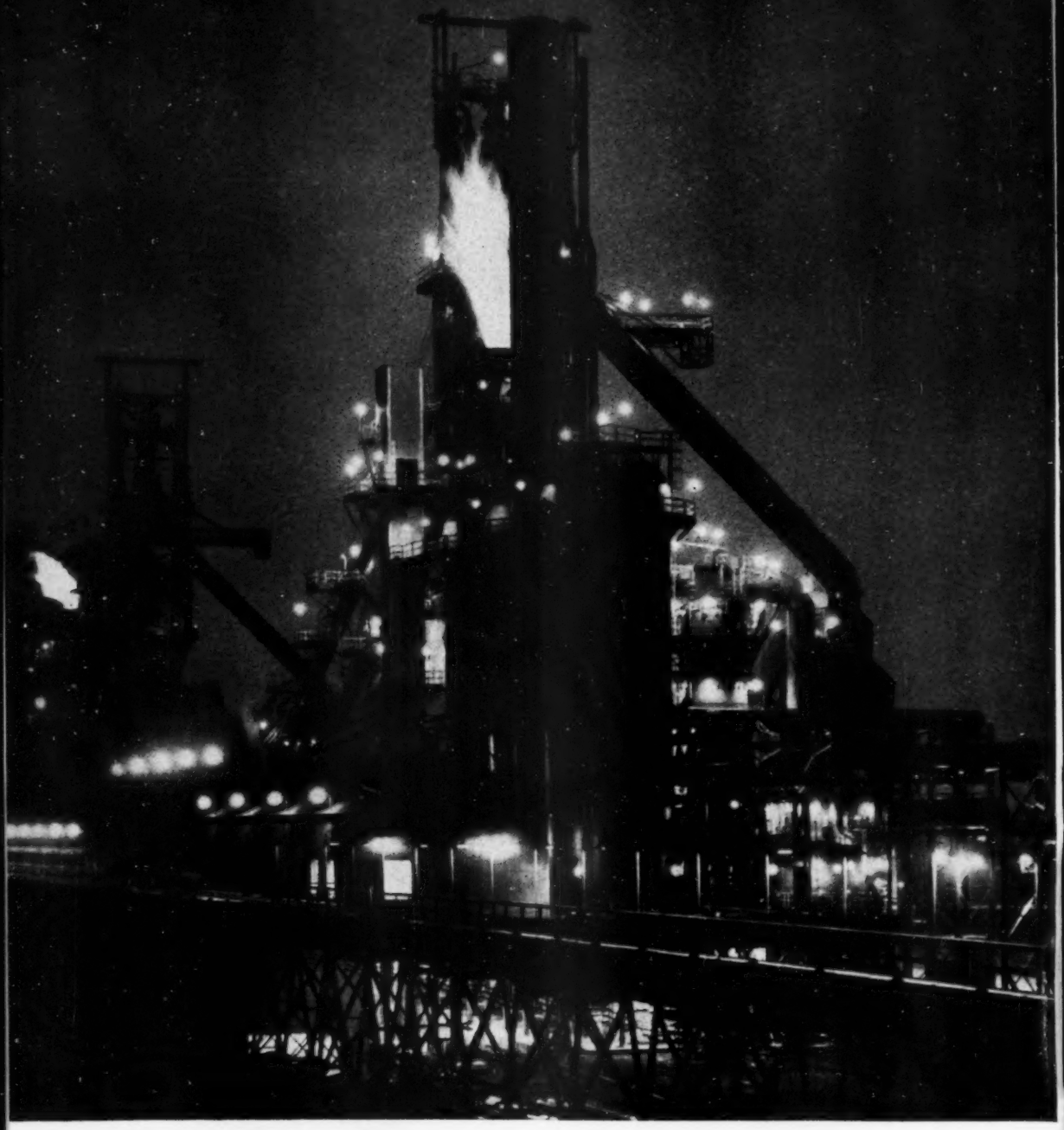
Efficient blenders, expertly-designed crushers, the world's largest range of screens and feeders—all are products of the skill, craftsmanship and experience of one of the world's largest engineering organisations.

rely on the experience of

G.E.C.

THE GENERAL ELECTRIC COMPANY LIMITED OF ENGLAND · FRASER & CHALMERS ENGINEERING WORKS · ERITH · KENT

by exclusive agreement...



Newton Chambers

NO. 3 BLAST FURNACE—DOMINION FOUNDRIES & STEEL LTD *Hamilton, Ontario, Canada, designed and installed by John Mohr & Sons. Recent orders include a 28 ft. dia. hearth furnace for United States Steel Corporation at Duquesne Works, to work at 30 lbs. per square inch top pressure.*

NEWTON CHAMBERS

now manufacture and install

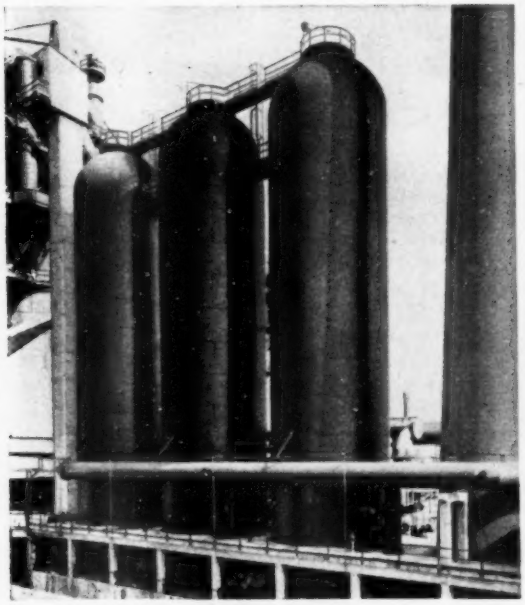
BLAST FURNACES and all ANCILLARY EQUIPMENT

to the designs of JOHN MOHR

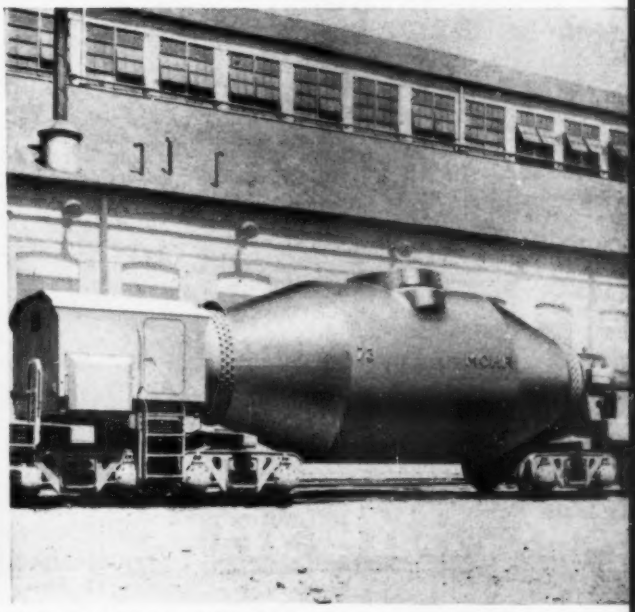
Newton Chambers are pleased to announce that they are now sole manufacturers and suppliers within the United Kingdom and elsewhere of complete blast furnaces to the latest designs of John Mohr & Sons, Chicago, U.S.A. Our traditional experience in this field is combined with that of John Mohr & Sons who have been particularly successful in the development of the modern blast furnace for high top pressure.

Consequently, we are now in a position to undertake complete blast furnace installations of the most up-to-date design, to reconstruct and modernise existing blast furnaces and to offer the whole range of modern blast furnace ancillary equipment.

remember the ever increasing scope of NEWTON CHAMBERS



MOHR HOT BLAST STOVES—
135 Stoves installed since 1942. Semi or completely automatic operation as required. Integral Stove Burners now available.

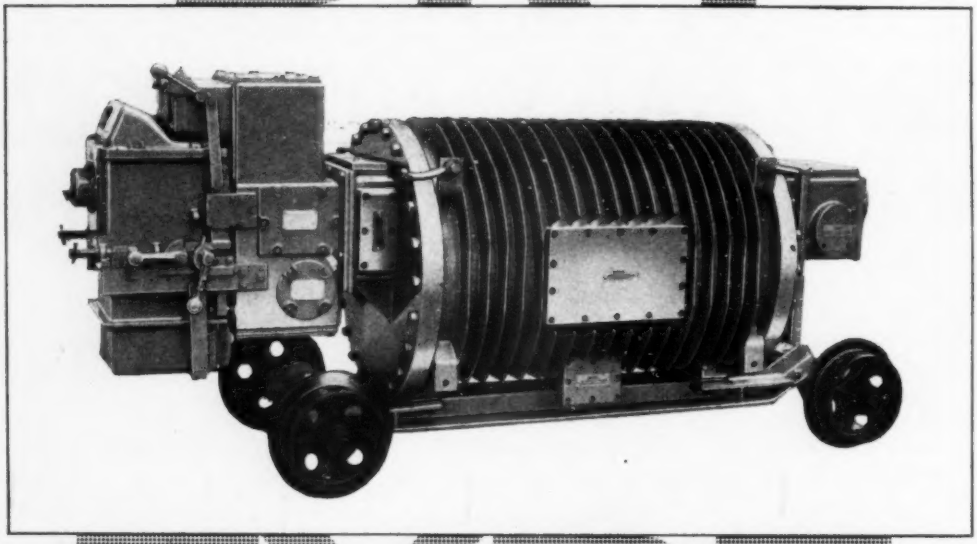


MOHR HOT METAL MIXER CAR,
capacity 200 tons. Range of sizes available to latest designs. Also Pneumatic Tipping Slag Ladles & Cars. Heavy Welded Ladles. Transportation Equipment. Primary Gas Washers. Gas Cleaning Plants.

NEWTON CHAMBERS & COMPANY LIMITED, ENGINEERING DIVISION, THORNCLIFFE, SHEFFIELD

FLAME PROOF

DRY



TYPE

MINING TRANSFORMERS

1 *The most widely used and first wholly British Dry-Type Transformer of its kind. Unlike the more conventional units it can be taken right up to the coal face. Location close to load centre reduces voltage drop through connecting cables and ensures better starting and operation of coal cutting motors.*

2 *Strong tank, free from projections likely to collect dust, can withstand normal falls of rock commonly experienced near coal face.*

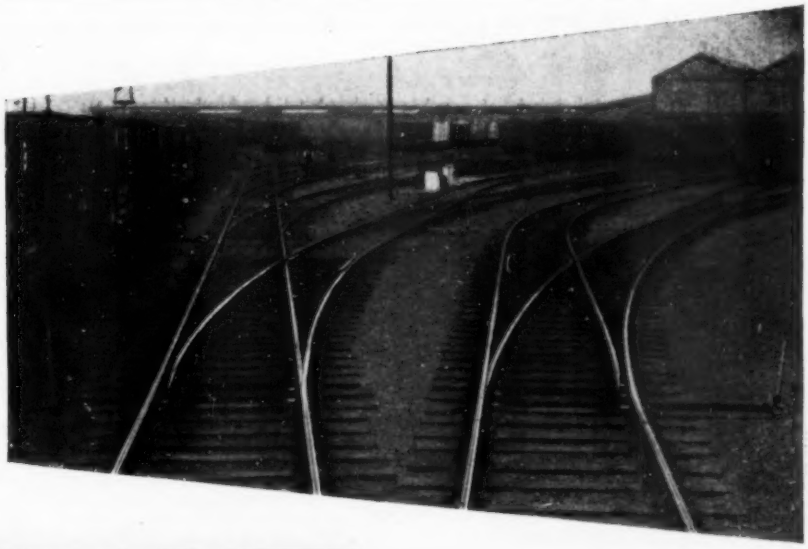
3 *High temperature dry type windings eliminate cooling fluids and possible hazards caused by fire or toxic gases. Maximum case temperature below that of conventional oil filled transformer. Further drop in temperature across cooling fins acts as safeguard against burn discomfort through accidental contact.*

BRUSH

BRUSH ELECTRICAL
ENGINEERING CO · LTD
LOUGHBOROUGH · ENGLAND

FLP
4196 GROUP I

A Member of the Hawker Siddeley Group



Railway Sidings by WARDS...

AT CAMBOIS COLLIERY BLYTH

Wards have been laying industrial sidings for over sixty years, and in this specialised field hold an enviable reputation as consultants and contractors. The design, construction and maintenance are all part of the service, and large resources and skilled labour force enable the simultaneous execution of a number of contracts, irrespective of size and location.

Typical of recent contracts undertaken for the National Coal Board is the one illustrated at Cambois Colliery, Blyth, near Newcastle, N.C.B. Northern (N. & C.) Division.

THOS. W. WARD LTD | **ALBION WORKS · SHEFFIELD**

Phone: 26311 (22 lines) Grams: "Forward, Sheffield"

LONDON OFFICE: BRETTENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2. Telephone: Temple Bar 1515

SC57

Pushes and Pulls

Fig. 1073 (Push) Certified FLP Signalling key.

Fig. 1073 (Push) Certified FLP Signalling Key. Operating knob completely encircled by a non-brittle S.G. iron guard cast integral with the cover. Fitted with S.P. morse key contact. Housed in a cast metal case having machined flanged joints. Separate sealed terminal compartment provided with ¾in. conduit entry with packed gland.

Fig. 1032 Double-Ended Pull.

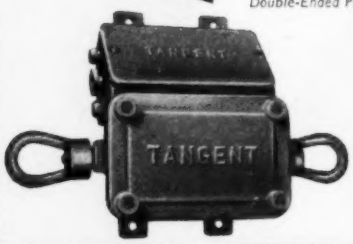


Fig. 1032 Double-Ended Pull. Robust single pole contact, normally open. Fitted with stainless steel pull rods and substantial return springs. Cast iron case has machined flanged joints and a separate terminal compartment provided with two ¾in. conduit entries with packed glands. S.W.A. and P.W.A. glands for cable up to $\frac{2}{16}$in. dia. under armour (or B.S. 708 type 61, ·0048in.) can be fitted. Also available as a single ended pull with stirrup for vertical operation (Fig. 1033).

GENTS OF LEICESTER **MINE SIGNALLING EQUIPMENT**

GENT & COMPANY LIMITED · FARADAY WORKS · LEICESTER

London Office : 47 Victoria Street, London, S.W.1 Also at : Birmingham · Bristol · Edinburgh · Glasgow · Newcastle · Belfast

West Midland Stockist : R.J.S. Services Ltd., Richmond Terrace, Shelton, Stoke-on-Trent. Phone : 29603/4

BRIQUETTE MACHINERY

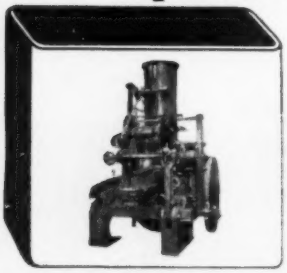
BY

YEADON SON & Co. Ltd.

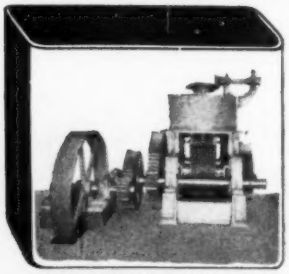
4 ALBION PLACE,

LEEDS 1.

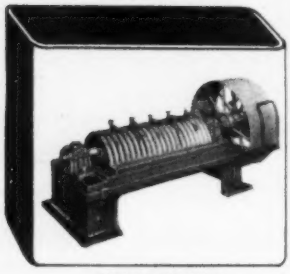
TEL. 32409



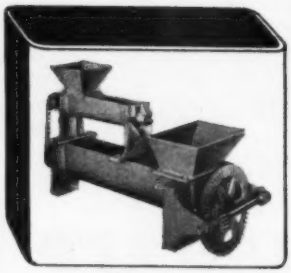
BLOCK PRESS



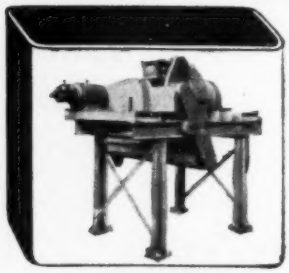
OVOID BRIQUETTE MACHINE



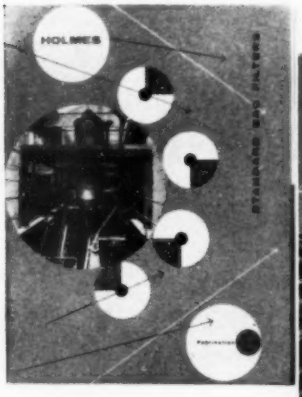
PITCH CRACKER

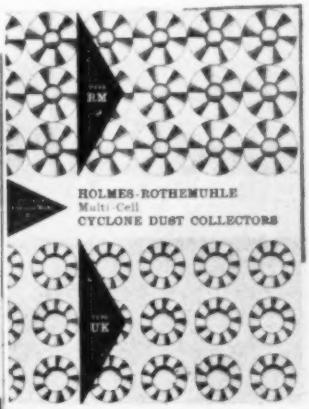


MIXER & MEASURER

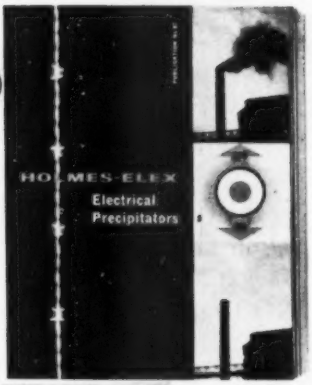


DISINTEGRATOR



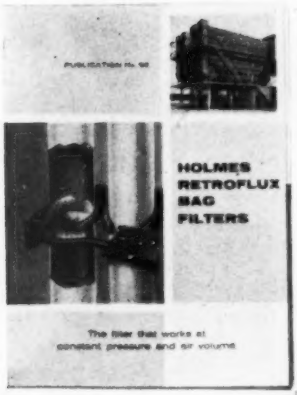


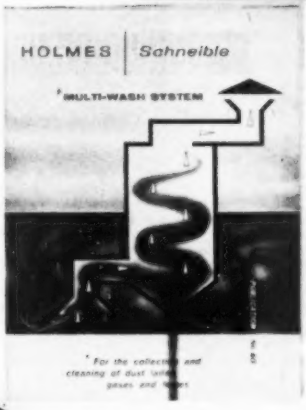
Which?



Which type of dust collection and control plant is most suitable, both technically and economically, for your particular application? A complete answer to this question lies within the pages of the various brochures illustrated. Have these brochures before you when you decide.

Ask for technical literature GCD/67.





W. C. HOLMES & CO. LTD.

A Member of the B.H.D. Engineers Limited Group of Companies.

Gas Cleaning Division
Turnbridge, Huddersfield

Tel: Huddersfield 5280 London: Victoria 9971
Birmingham: Midland 6830

C101-1

Better lamps—better lamprooms

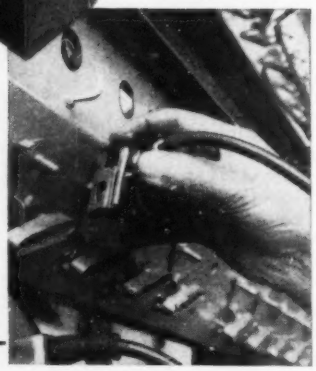
WITH THE NEW

PATTERSON CAP LAMPS

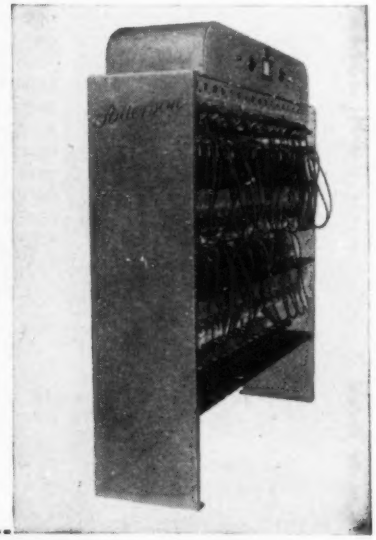
AND CHARGING RACK

Improved light output and long trouble-free life are features of the new Patterson cap lamps. Fitted with high grade reflectors, silver tipped contacts, and Exide lead-acid batteries, they work brilliantly without a flicker.

They are automatically kept at the peak of efficiency by the attractive new Patterson charging rack. This is based on the headpiece key-type charging system and is designed to increase lamproom efficiency and reduce lamproom labour.



The type SS 3 self-servicing cap lamp and headpiece. It fits any standard headpiece key-type charging equipment or can be used with the new Patterson charging rack.



To: PATTERSON LAMPS (1953) LIMITED
1 Second Avenue, Team Valley, Gateshead-on-Tyne 11
Please send me further details of your new cap lamp and charging rack.

NAME_____

ADDRESS_____

PATTERSON LAMPS (1953) LIMITED

Makers of Miners' Lamps and Lamproom Equipment for over 70 years

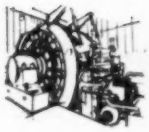
1 SECOND AVENUE, TEAM VALLEY, GATESHEAD-ON-TYNE 11

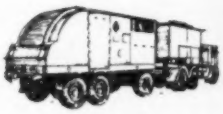
Telegrams: Lamps, Phone, Gateshead-on-Tyne · Telephone: Low Fell 75481/2

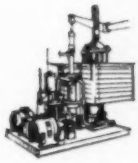
TGA P150A

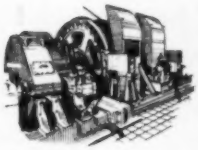
ROBEY
OF LINCOLN

Many thousand tons of coal and many thousand men are moved daily in safety by Robey winders.
Drum, Friction, Mobile Winders · Robey-Crompton Patent Positive Power and High Pressure Brakes.
Welded all-steel Headgear Pulleys









ROBEY & CO. LTD
MINING DEPARTMENT · PO BOX 23 · LINCOLN 21381
LONDON OFFICE · 11 PRINCES STREET · HANOVER SQUARE W1
HYDE PARK 4971

when you call in Boyles Bros. ...

3 factors will decide the final outcome

Equipment

We make it! We manufacture a complete line of modern diamond drills—underground and surface models, compressed air, gasoline or diesel power. Capacities range from 200 to 5000 feet. We also manufacture hundreds of auxiliary items—everything from core splitters to 60-foot derricks. We are exclusive manufacturers of PERMASET diamond bits and reaming shells—available in all standard sizes and in a multitude of patterns developed to penetrate every known formation with speed, economy and maximum core recovery.

Experience

We have it! During the last 30 years, Boyles Bros.' crews have successfully completed more than 3000 contracts in mining areas throughout the world. As a result of this wide experience we have developed equipment, techniques and procedures to cope with every formation, every transportation and climatic problem likely to be encountered on drilling operations anywhere.

Efficiency

We maintain it! Once begun, no Boyles Bros. drilling program is ever halted for want of men, equipment, bits or parts. Crews are handpicked for experience, dependability and local knowledge; they operate under expert supervision at all times. With strategically located branches and subsidiary companies, we are equipped to render real service in core or blasthole drilling, foundation tests, soil sampling, horizontal drainage drilling and other related problems.

For information and quotations, submit your requirements to Newcastle upon Tyne, 3.

UNITED KINGDOM

AFRICA

FRENCH MOROCCO

PAKISTAN

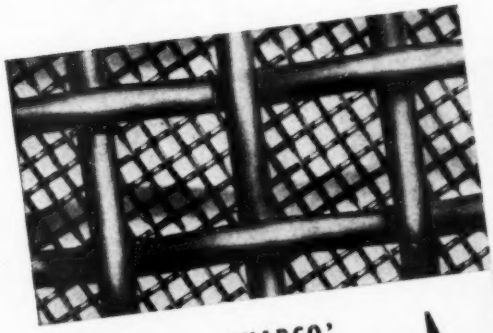
RUSSIA

...all three work constantly for you on every job we do.

BOYLES BROS
DRILLING COMPANY LTD.,
NEWCASTLE-UPON-TYNE 3
ENGLAND

3 THINGS TO REMEMBER

WHEN ORDERING SCREENS AND FILTERS

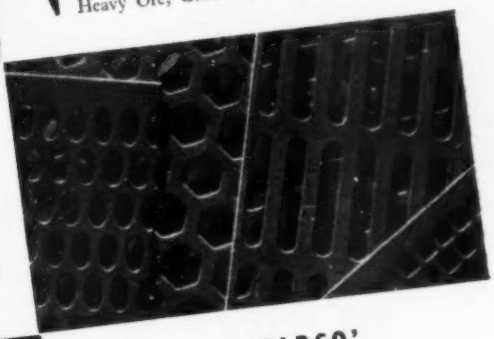


1 HARVEY HIGH CARBON STEEL WIRE SCREENS

Woven from steel made to Harvey's own analysis, these screens offer the maximum resistance to abrasion and fracture from fatigue. Highly recommended for use with all grades of Coal, Stone, Heavy Ore, Granite, Sand and Gravel.

2 'HARCO' PERFORATED METALS

Highest quality metals with clean and accurate perforations ensure long life and trouble-free service. A wide range of sizes and patterns is available, including many for specialised purposes. Ornamental and embossed patterns also supplied.



3 'HARCO' WOVEN WIRE

Uniform and dependable sizing makes this the ideal cloth for powders and liquids. Any gauge and any mesh can be supplied in a wide range of metals covering all industrial uses. Complete Filters and Strainers of various types also supplied.

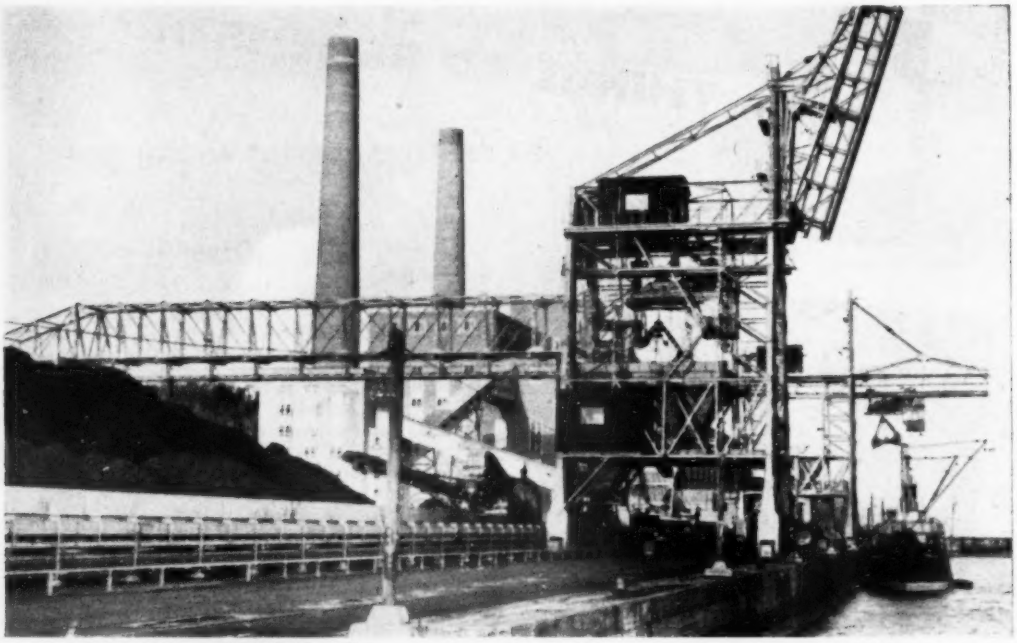
Illustrations and details are in our Catalogues Nos. 926 and 1042. Please send for copies.

HARVEY

G. A. HARVEY & CO. (LONDON) LTD.
WOOLWICH ROAD · LONDON · S.E.7
Telephone: GREenwich 3232 (22 lines)

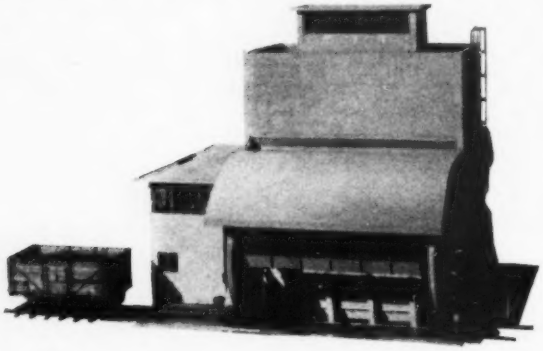
Other HARVEY Facilities and Products: CLASS 1 WELDED PRESSURE VESSELS TO LLOYD'S AND A.S.M.E. CODES · DIE-PRESSED AND 'ROTARPREST' HEADS UP TO 15 ft. DIA.—*Larger sizes to specification* · SHEET METALWORK OF EVERY DESCRIPTION · HEAVY MACHINING & FITTING · STEEL SHELVING & STORAGE EQUIPMENT · GALVANIZING · TANKS, CISTERNS & CYLINDERS

W/Wg/P/2



BULK HANDLING PLANT by STRACHAN & HENSHAW

The coal handling plant at the Portishead power station of the Central Electricity Generating Board incorporates: two Ship Unloaders of 150 t.p.h. each: one Storage and Reclaiming Transporter (260 t.p.h.) two Rotaside Wagon Tipplers (with S & H patented Dust Trapping System). Wagon marshalling plant etc. One of the dust trapping Wagon Tipplers is shown below.



SHIP UNLOADING • STORAGE & RECLAIMING • WAGON TIPPLING • WAGON MARSHALLING

STRACHAN & HENSHAW LTD

STEELHOIST WORKS · BRISTOL 2 · ENGLAND

LONDON · GLASGOW · JOHANNESBURG · MELBOURNE · CALCUTTA · CHRISTCHURCH (N.Z.)

and so a sinter plant is built

TODAY
The blast furnaces are consuming the full output of the sinter machine HH installed as part of the expansion programme at the Gartsherrie Works of Bairds & Scottish Steel Ltd.

TOMORROW
To cater for the future, the plant was designed so that a second sinter machine, although located away from the first strand, can receive raw materials from the same feed system.

ALWAYS
HH sinter plants are built to suit individual conditions so that every client obtains maximum benefit from progressive design. Precise control of the mix, the special forced draught cooler and a very adaptable stockyard arrangement are but three of the many specialities that make HH plants such economical producers of high quality sinter.

CONTINUOUS SINTERING PLANTS BY

Huntington, Heberlein & Co. Ltd

SIMON HOUSE, 28-29 DOVER STREET, LONDON W.1.
Telephone: Hyde Park 8191 Telex: 2-3165
Telegrams: Innovation Wesphone London Telex

BRANCH COMPANY
SE
SIMON ENGINEERING LTD

OVERSEAS REPRESENTATIVES:
Simon-Carves (Africa) (Pty) Ltd: Johannesburg
Simon-Carves (Australia) Pty Ltd: Botany, N.S.W.
Simon-Carves Ltd: Calcutta
Simon-Carves of Canada Ltd: Toronto

HH35/PS

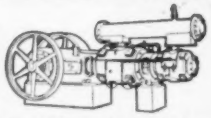
An UNDERGROUND COMPRESSOR

that's COOL as well as COMPACT

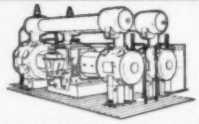
LOW HEIGHT ROTARY COMPRESSOR for UNDERGROUND MINING

Specially designed as a low-height mine car unit, this Class RE 'Power Vane' Rotary Electric Compressor has the compact appearance typical of this type of machine. Another special feature is cool running—the discharge temperature being some 100°F lower than that of any equivalent reciprocating compressor. Standard models may be air or water-cooled, and flameproof drive and full protection equipment is fitted for safe, underground service As rotary units, there are no pistons, valves or crankshaft to go wrong, and maintenance is simplified. 'Power Vane' Compressors are available for service up to 500 c.f.m. at normal working pressures. *Full technical literature on request.*

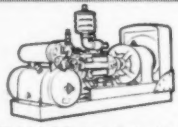
THERE IS A CP COMPRESSOR FOR EVERY TYPE OF DUTY



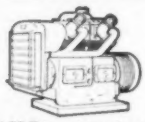
CLASS T straight-line, double-acting, single and multi-stage compressors for outputs up to 745 c.f.m. or pressures up to 2,500 p.s.i.



CLASS FE balanced-opposed multi-cylinder compressors for outputs up to 8,000 c.f.m. or pressures up to 3,000 p.s.i.



CLASS RE electrically driven Rotary Air Compressors for outputs up to 510 c.f.m. at 100 p.s.i.



CLASS P two stage air-cooled compressors for outputs up to 477 c.f.m. at 100 p.s.i.

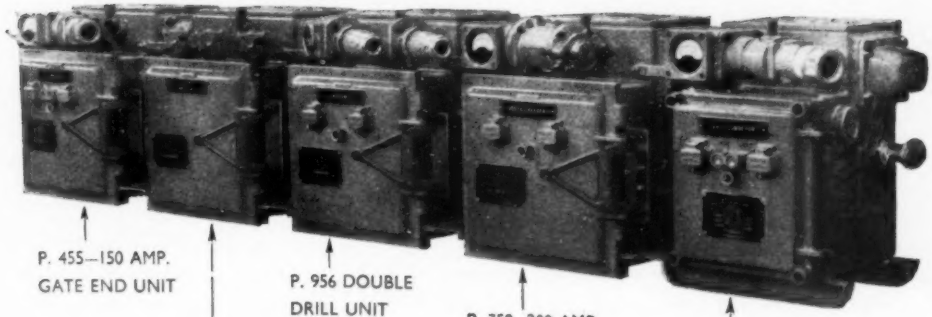
Consolidated Pneumatic

CONSOLIDATED PNEUMATIC TOOL CO. LTD · DAWES ROAD · LONDON · S.W.6

WECO

present . .

THE TYPE P.59
30 AMP.
GATE END STARTER UNIT



FLP

Completing a range including the type P455 Gate End Switch, the type P857 Lighting Transformer, the type P956 Drill Control Panel and the type P758 Section Switch, all to N.C.B. Standard Specifications

CURRENT LITERATURE ON REQUEST

THE WALLACETOWN ENGINEERING CO. LTD.
VIEWFIELD ROAD AYR, SCOTLAND
TELEPHONE AYR 64618-9 WECO GRAMS WALENCO, AYR

CARDIFF NEWCASTLE-ON-TYNE SHEFFIELD MANCHESTER WOLVERHAMPTON

Aerex

MINE VENTILATION FANS

have all the good points

- Axial and Radial flow fans.
- Individually designed to suit particular conditions.
- Backed by a wide experience of fan applications in this country and abroad.
- Highly efficient.
- Quiet in operation.
- Economical running costs.
- Low maintenance.
- Services include complete erection and any necessary civil engineering work.

Also standard or specially designed auxiliary ventilating fans.

Write for Publication 807—it describes all Aerex products.

AEREX LIMITED, 220/238 WEST STREET, SHEFFIELD 1

Telephone: Sheffield 28441 Telex No: 54-206

London and Export Office:
Auckland House, New Zealand Avenue, Walton-on-Thames, Surrey
Telephone: Walton 24191

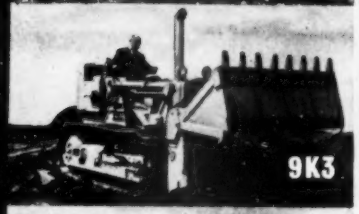
Also Birmingham, Manchester, Stockton, Glasgow and Aldridge, Staffs.

Overseas: MONTREAL, JOHANNESBURG AND SYDNEY, N.S.W.

The INTERNATIONAL

15-K3 DROTT

fills the gap!



...between the smaller and largest crawler shovels available today—both in size and price. With its 2¼ cu. yd. "four-in-one" equipment, 115 BHP 6-cylinder diesel engine, and fully reversible 6-speed transmission, the 15-K3 Drott represents exceptional value for money. High power-to-weight ratio provides forceful performance with excellent output and outstanding economy.

Offering unlimited advantages and scope, the range of International Drott crawler tractor shovels is proving itself continually on sites across the globe. Today the B-6K3 is the worlds biggest selling tractor shovel, though in popularity its brothers follow close behind.

Amongst the many job proven features which set the Drott head and shoulders above its competitors are the following:-

- Shock swallowing 'Hydro-Spring' reducing impact forces on tractor and operator by 67%.
- Drott pry-out over skid-shoe action increases bucket breakout power by up to six times.
- Parallelogram type linkage keeps the bucket at a non-spill level throughout the 'raise' action. It also allows a maximum of forward vision as a result of its simplified design.

Included in a variety of job-matched equipments from skid-grapples to side-tips, the exclusive '4-in-1' bucket stands out as the most important —and popular. Fitted with this bucket, the machine's versatility is limitless and at the touch of a lever the operator can change from loading to excavating, bulldozing, grading, stripping, spreading, compacting...

TABLE SHOWING COMPARATIVE BUCKET CAPACITIES AND ENGINE H.P.

MODEL	B-6K3	B-8K3	9K3	15K3	B-20K3
BUCKET CAPACITY (cu. yds.)	1	1¼	1½	2¼	3
B.H.P. (at engine flywheel)	50	60	71	115	124

INTERNATIONAL HARVESTER

Every one backed by unrivalled service

CRIPPS

R. CRIPPS & COMPANY LIMITED ESTABLISHED 1891

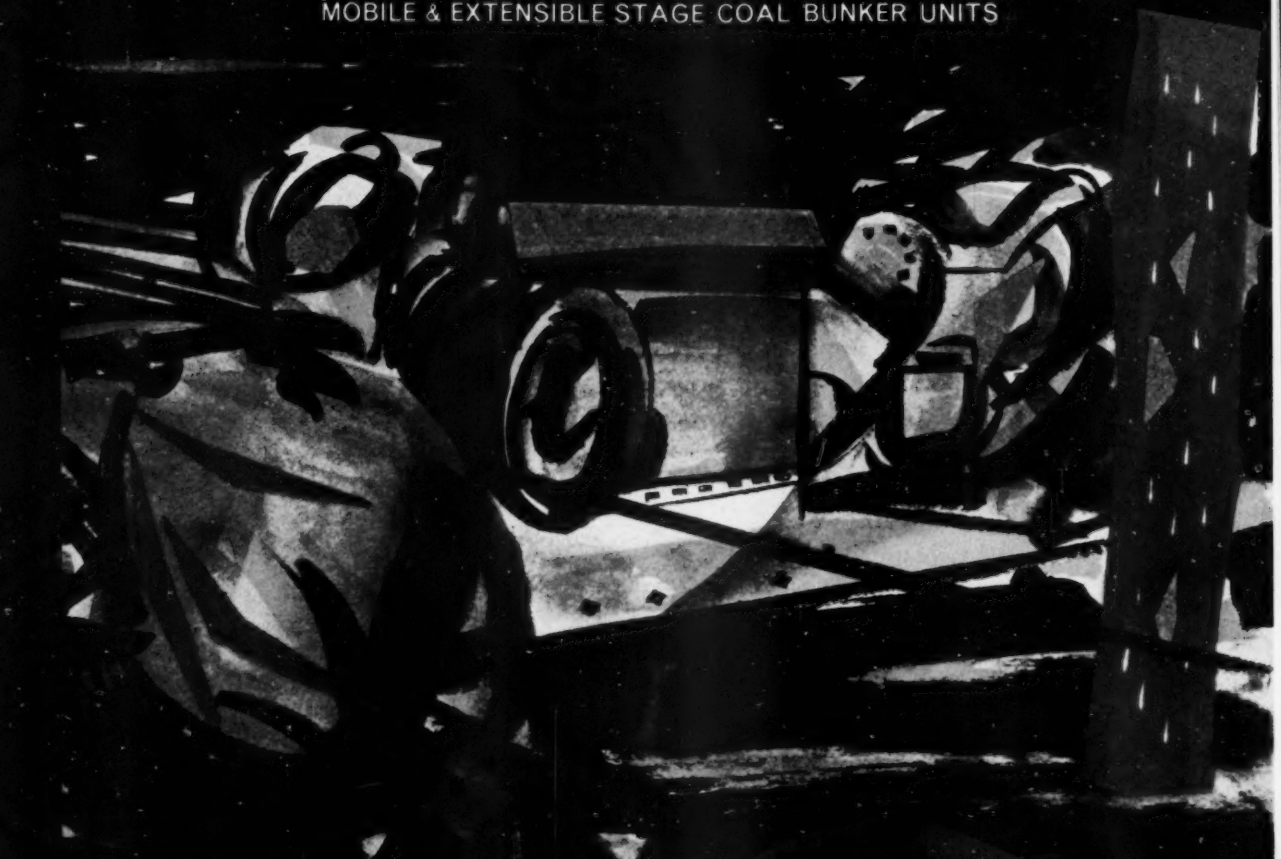
NOTTINGHAM, Tel. 71161. MANCHESTER, Tel. Trafford Park 1658. SHILDON, (Co. Durham) Tel. 261.

CRAWLEY

MINING EQUIPMENT

Crawley thin seam mining equipment includes:—

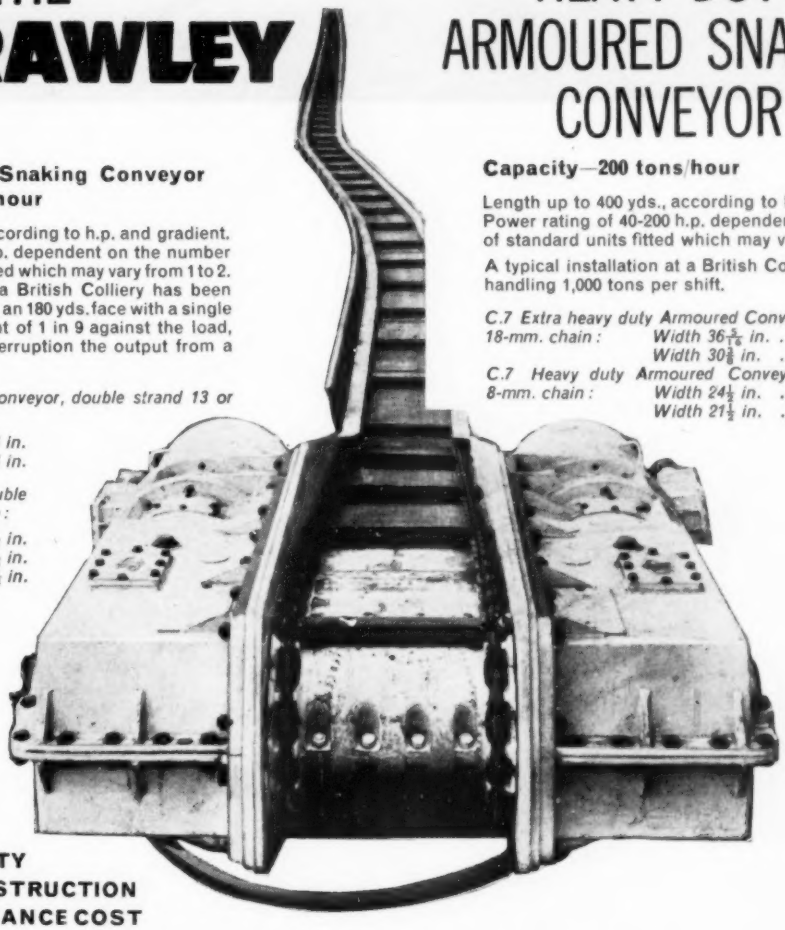
CRAWLEY-WILCOX CONTINUOUS MINERS · MOBILE BUNKER CONVEYORS
CRAWLEY MIDGET MINERS · MOBILE STAGE LOADERS
LO-HITE ARMOURED SNAKING CONVEYORS · MOBILE STAGE FEEDERS
HEAVY DUTY SNAKING CONVEYORS · EXTENSIBLE STAGE LOADERS
STATIONARY BUNKER CONVEYORS · EXTENSIBLE TUB LOADERS
MOBILE & EXTENSIBLE STAGE COAL BUNKER UNITS



Write for **CRAWLEY** *"Mining Equipment" Catalogue NOW!*

THE CRAWLEY

HEAVY DUTY ARMOURED SNAKING CONVEYOR



• HEAVY DUTY
Lo-Hite Armoured Snaking Conveyor
Capacity—120 tons/hour

Length up to 180 yards according to h.p. and gradient. Power rating of 40-100 h.p. dependent on the number of standard units to be fitted which may vary from 1 to 2. A typical installation at a British Colliery has been operating successfully on an 180 yds. face with a single 40 h.p. unit, on a gradient of 1 in 9 against the load, and handling without interruption the output from a power-loading machine.

C.6 Lo-hite Armoured Conveyor, double strand 13 or 14 mm. chain:

Width 24½ in. . . Height 6 in.
Width 21½ in. . . Height 6 in.

C.5 Lo-hite Conveyor, double strand 13 or 14 mm. chain:

Width 24½ in. . . Height 5⅛ in.
Width 20½ in. . . Height 5⅛ in.
Width 16½ in. . . Height 5⅛ in.

Capacity—200 tons/hour

Length up to 400 yds., according to h.p. and gradient. Power rating of 40-200 h.p. dependent on the number of standard units fitted which may vary from 1 to 4.

A typical installation at a British Colliery is currently handling 1,000 tons per shift.

C.7 Extra heavy duty Armoured Conveyor, treble strand 18-mm. chain:
Width 36⅝ in. . . . Height 7⅛ in.
Width 30⅜ in. . . . Height 7⅛ in.

C.7 Heavy duty Armoured Conveyor, double-strand 8-mm. chain:
Width 24½ in. . . . Height 7⅛ in.
Width 21½ in. . . . Height 7⅛ in.

• HIGH CAPACITY
RUGGED CONSTRUCTION
LOW MAINTENANCE COST

Maximum degree of snake to ensure moving over in the shortest distance, together with a high degree of lateral flexibility for undulating gradients. Alloy steel sprockets, giving long trouble free service. Various types of spill plates available to suit operating conditions. Special patented sectionalised pans for insertion at intervals in the conveyor run enable the pan line to be broken for inspection without breaking either top or bottom chain. Chain speed from 114 ft. to 185 ft. per minute to suit individual conditions. All types of conveyors can, at request, be supplied with N.C.B. recommended drive frame and gear boxes.

All Crawley Heavy Duty Machines have the following units standard and interchangeable:

DRIVE FRAME • GEAR BOX • GEAR ASSEMBLIES
EXTENSION SECTIONS • STRUCTURE • TAIL UNIT
CHAIN FLIGHTS

CRAWLEY INDUSTRIAL PRODUCTS LTD · LLANELLY
CARMARTHENSHIRE · S. WALES · Tel: Llanelly 4233

AYLING INDUSTRIES GROUP

CRAWLEY

CONSETT IRON COMPANY LTD.
CONSETT • • • • COUNTY DURHAM
Telephone: Consett 341 (12 lines). Telegrams: Steel, Phone, Consett

FOUNDRIES, REFRACTORIES, and ENGINEERING Service for Industry

Our foundries and engineering shops, the largest in South Wales, provide a service, not only to the nation's steel industry, but to all leading industries throughout Britain and the world.

IRON CASTINGS. Heat Resisting and Grey Irons to B.S.S.1452—up to 30 tons; Alloy Irons to specification—up to 8 tons. 'As cast' or machined.

SPHEROIDAL GRAPHITE IRON CASTINGS to B.S.S.2789—up to 8 tons. 'As cast' or machined.

INGOT MOULDS and BOTTOM PLATES. All types in Hematite Cast Iron—up to 30 tons.

SLAG LADLES. All types.

PATTERN SHOPS.

GENERAL ENGINEERING, FABRICATION, and MACHINE SHOPS.

SILICA BRICKS and REFRACTORY MATERIALS. Standard and non-standard shapes and sizes.

RAIL WAGON BUILDING and REPAIR in steel or wood.

RTB

The services of Sales Technicians are available. Literature will be sent on request.

Richard Thomas & Baldwins Limited

SALES DEPARTMENT, LANDORE GROUP OF WORKS, LANDORE, SWANSEA, GLAM. *Telephone:* SWANSEA 71261 (6 lines)
HEAD OFFICE: 47, PARK STREET, LONDON W.1

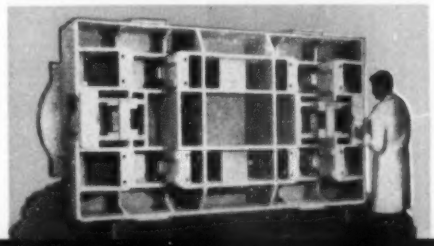
Further Foundry and Engineering Facilities at our MACHYNYS WORKS, *Llanelly, Carms.*

(Left) 14 cwt. capacity ingot mould.
(Right) 20-ton capacity ingot mould.

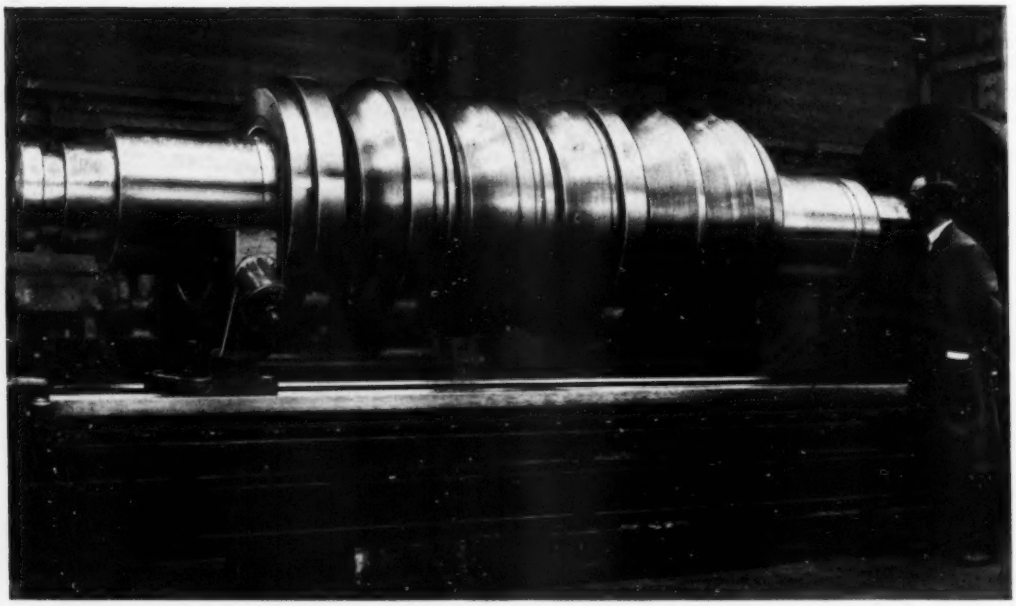
Silica bricks in one of our despatch bays.

Reactor boxes cast in spheroidal graphite (nodular) iron for the International Nickel Company (Mond) Ltd. Clydach, Swansea.

View of underside of 80-ton capacity ingot car supplied to Ebbw Vale Steel Works.



WHAT'S YOUR ANGLE ?



A special grooved grain quality finishing roll for 8″ × 6″ angles. It weighs over 20 tons, is 185″ overall with 40″ centres and 96″ barrel length. Have *you* a roll problem? We should be pleased to discuss it with you.

THE BRITISH ROLLMAKERS CORPORATION LIMITED

R. B. TENNENT LTD.,
WHIFFLET FOUNDRY, COATBRIDGE, SCOTLAND.
TEL.: COATBRIDGE 425.

C. AKRILL LTD.,
WESTON ROAD, CREWE.
TEL.: CREWE 3412.

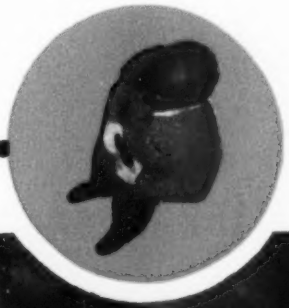
THOMAS PERRY LTD.,
HIGHFIELD WORKS, BILSTON.
TEL.: BILSTON 41224.

MIDLAND ROLLMAKERS LTD.,
WESTON ROAD, CREWE.
TEL.: CREWE 3412.

LONDON OFFICE: 38 VICTORIA STREET S.W.1 Telephone ABBey 6407

B.R.C. 35

The man on the spot...



HUWOOD *Slung Structure*

Much of the present-day demand for conveyor structure which can be suspended from the roof has been created by the availability of Huwood Slung Structure—the first choice of a growing number of those mining engineers whose judgment in such matters is sharpened by day-to-day experience.

In common with many other Huwood elevated structures for use in gate and trunk roads, Huwood slung structure is based on the F.T. section which is fitted throughout with Huwood self-lubricating oil-filled rollers and is one of the most robust and serviceable conveyor sections used in present-day mining.

HUGH WOOD & CO. LTD.

Head Office and Factories:
GATESHEAD-ON-TYNE, 11.

Industrial and Export Office:
ROYAL LONDON HOUSE, FINSBURY SQUARE, LONDON, E.C.2

Grams: Huwood, Gateshead. Phone: Low Fell 76083 (5 lines). Grams: Huwood Stock, London, Phone: Monarch 3273 (4 lines)

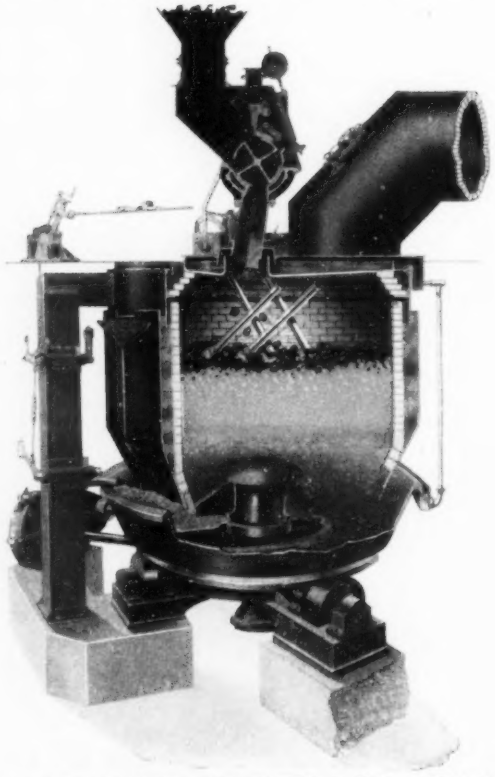
F/FA/202

MORGAN
PRODUCER
GAS MACHINES

WELL OVER 1000 SOLD of which a high proportion are of the LATEST HIGH CAPACITY TYPE

- **EFFICIENT GASIFICATION up to 3 TONS per hour giving constant flow of GAS OF UNIFORM QUALITY**

Minimum Maintenance Costs . . .
Minimum Labour Costs . . .
Extreme Reliability . . .



Other Specialities include:

SOAKING PITS (Isley controlled)

HOT METAL MIXER CARS

MILL FURNACES

TYPHOON ROTARY FLAME GAS BURNERS

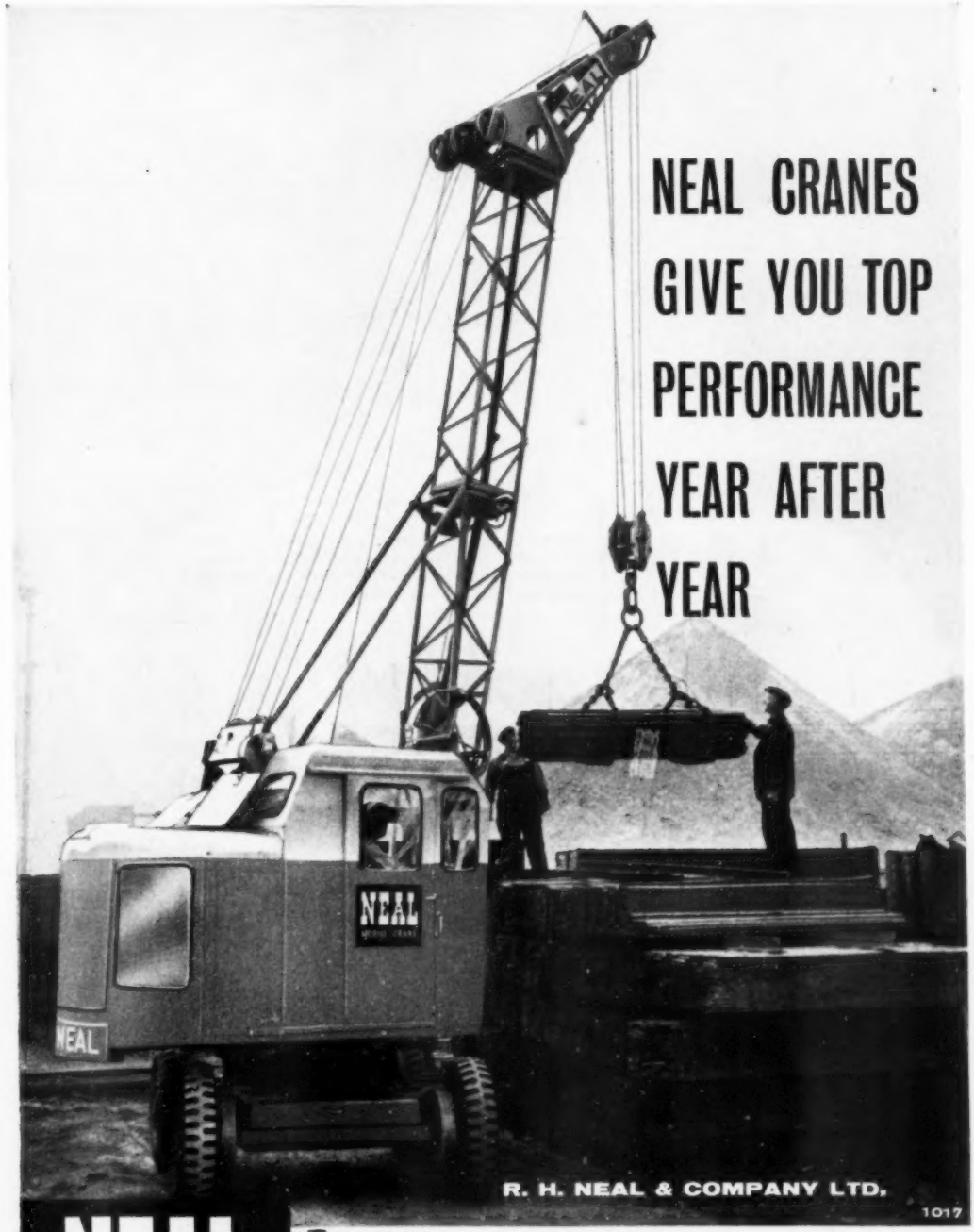
NASSHEUER CONTINUOUS BRIGHT ANNEALING FURNACES (*Sole Licensees*)

CONSULTATIONS and REPORTS

THE INTERNATIONAL CONSTRUCTION CO.
LIMITED
SUCCESSORS TO JULIAN KENNEDY, SAHLIN & CO., LTD.

Telephone: HOLBORN 1871
Telegrams: SAHLIN, WESTCENT 2. LONDON

56, KINGSWAY, LONDON, W.C.2

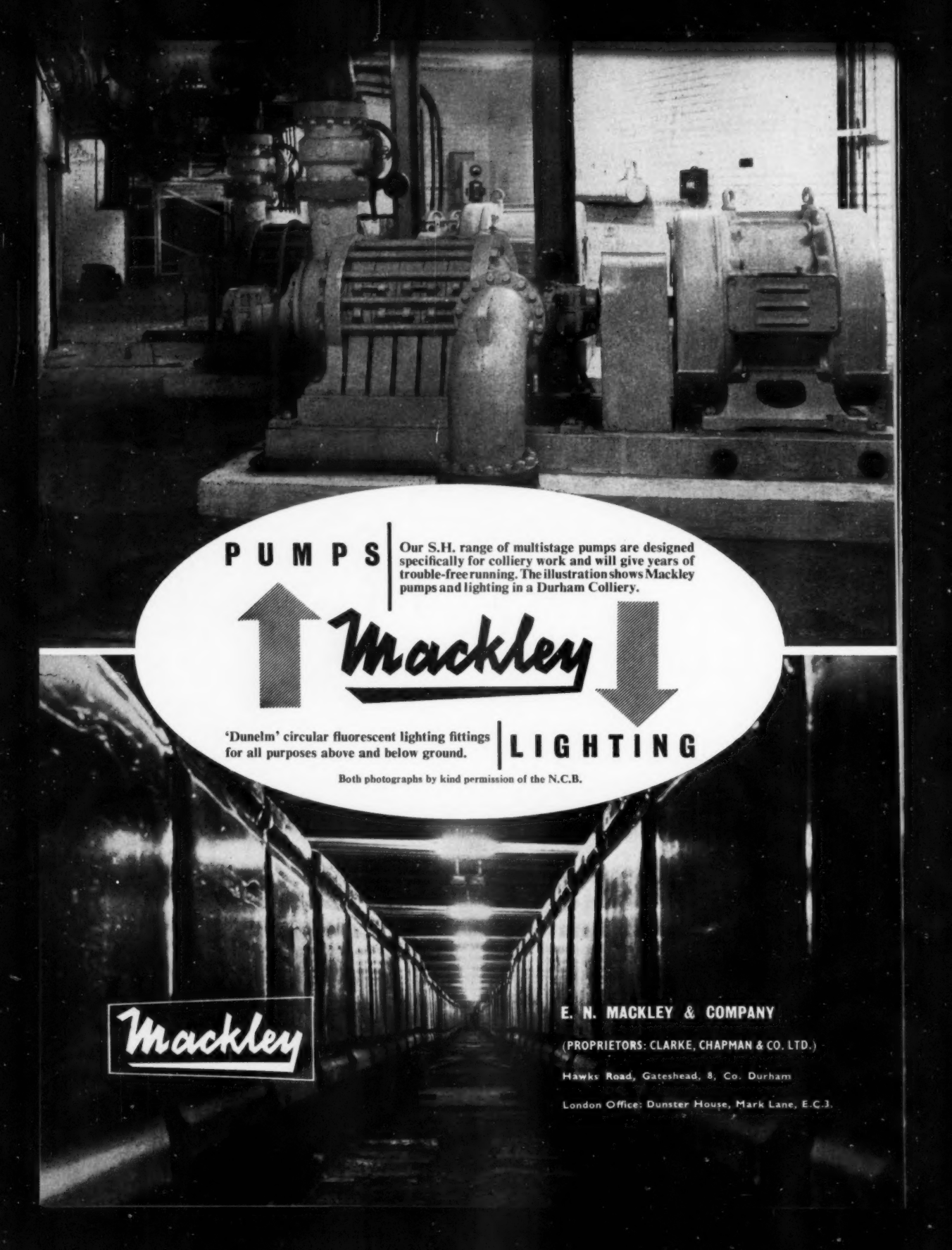


NEAL
MOBILE CRANES

The name behind the best Cranes

STEEL HOUSE, EASTCOTE, MIDDLESEX.
SALES AND SERVICE: LONDON, BRISTOL, BIRMINGHAM, MANCHESTER, LEEDS, NEWCASTLE, GLASGOW.

A MEMBER OF THE STEEL GROUP OF CRANE AND EXCAVATOR MANUFACTURERS.


PUMPS
Our S.H. range of multistage pumps are designed specifically for colliery work and will give years of trouble-free running. The illustration shows Mackley pumps and lighting in a Durham Colliery.
Mackley
'Dunelm' circular fluorescent lighting fittings for all purposes above and below ground.
LIGHTING
Both photographs by kind permission of the N.C.B.
Mackley
E. N. MACKLEY & COMPANY
(PROPRIETORS: CLARKE, CHAPMAN & CO. LTD.)
Hawks Road, Gateshead, 8, Co. Durham
London Office: Dunster House, Mark Lane, E.C.3.

For flame-proof colliery conveyor belting

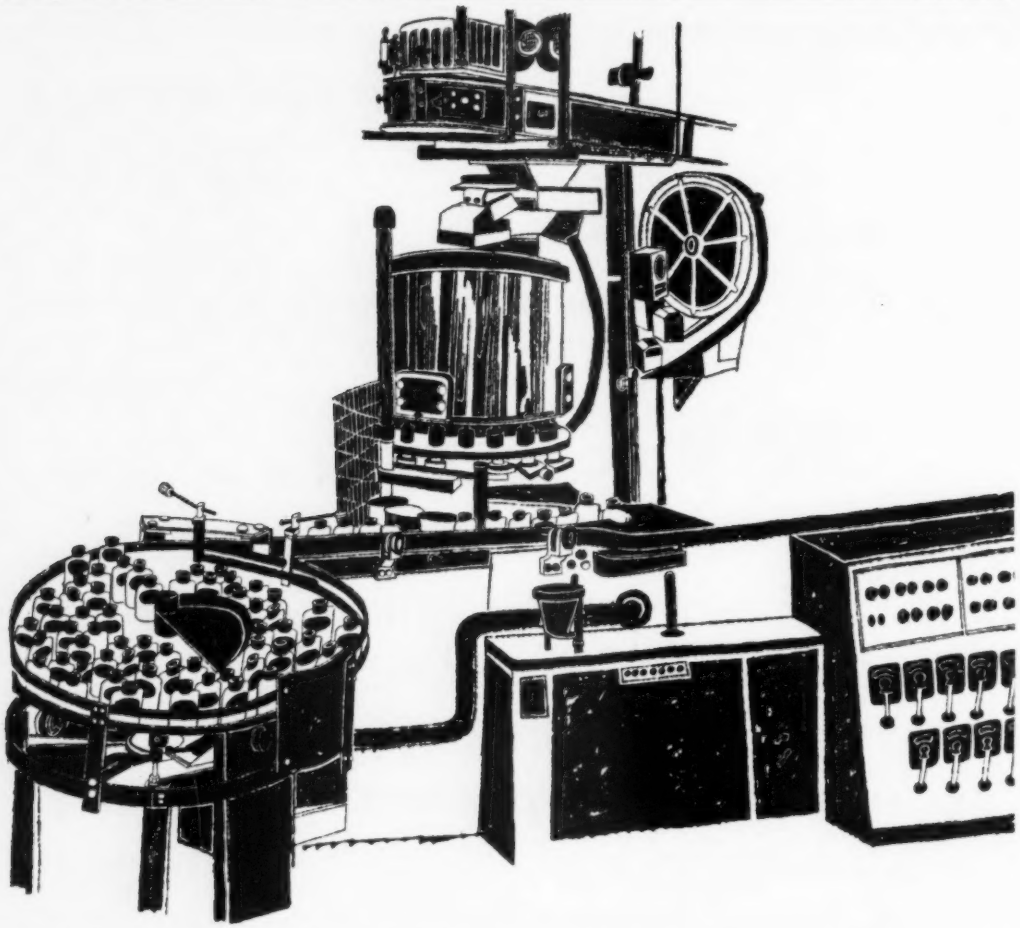
WE TAKE NYLON...

and solid weave it into a carcass, tough and enduring . . . then we impregnate it with plastic, bonded deep into the heart of the fibres.
The result is **Fenaplast Diamond** the world's best proved coal conveyor belting, now available in five weights ranging from the new Type 2200 to Extra Heavy Diamond.

developed, produced and sold throughout the world by

J. H. FENNER & CO · LTD
HULL · YORKSHIRE

H.F. 8788



THE MONEY THAT MANAGEMENTS SAVE THROUGH MOBIL ECONOMY SERVICE

More than £3,000 saved in a year at Reckitt & Sons Ltd

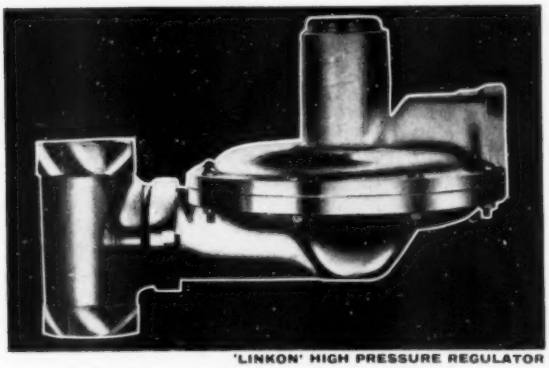
RECKITT AND SONS LTD of Hull, asked Mobil to suggest improvements in the maintenance and lubrication systems at four of their factories. Mobil advised using a card index system to ensure regular and correct lubrication, reducing the number of oils stocked, reclamation of used oil, and several other schemes of preventive maintenance and purchasing rationalisation.

In one year, after applying Mobil's recommendations, Reckitt made a direct saving of over £3,000. A further immediate saving of over £900 is probable.

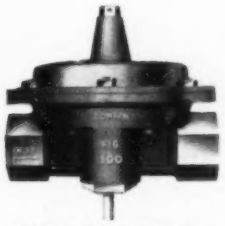
World-wide experience of industrial lubrication has been built up by the Mobil Organisation over 90 years. The Reckitt case is one of hundreds in which the recommendations of the Mobil Economy Service have successfully cut lubrication and maintenance costs.

Specialist knowledge methodically applied is the value of the Mobil Economy Service. The total lubrication requirements of a business and the minimum number of lubricants in the smallest quantities it needs must be assessed. And everyone concerned must know how to achieve the best lubrication results with the greatest economy of labour. These are tasks undertaken by the Mobil Economy Service —and the big savings resulting from its recommendations are a measure of its success.

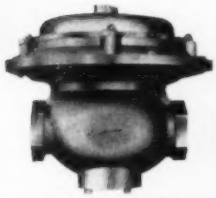
Mobil
ECONOMY SERVICE



'LINKON' HIGH PRESSURE REGULATOR



SAFETY CUT OFF VALVE



DIAPHRAGM PRESSURE REGULATOR

LOW PRESSURE REGULATOR

equipment for the **control** *of industrial gases*

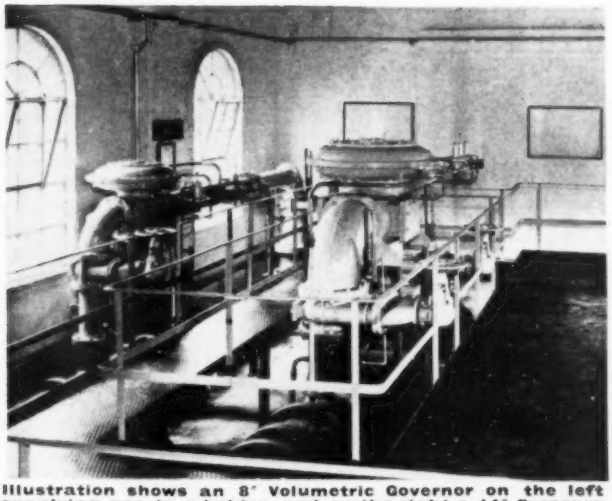


Illustration shows an 8" Volumetric Governor on the left supplying gas to a holder, and on the right a 14" Pressure Governor, clock controlled to give three pressures daily

Regulators of many sizes are made in diameters between ¾" and 36" for use on air or gases to operate on either a pressure or volume basis, covering a very wide range of flows to suit the process to which they are applied.

Relief Valves and proportioning Governors are available to cater for the close control to a preset figure the admixture of air to gas or gas to gas. Safety devices can be provided for many special purposes, such as air and gas cut-offs, so also can warning devices operated by diaphragm switches.

High and low pressure gas regulators have been supplied to the fuel industries for many years and with the recent advances in liquid petroleum gases and natural gas, our regulators have been used for pressure and volumetric control.

The

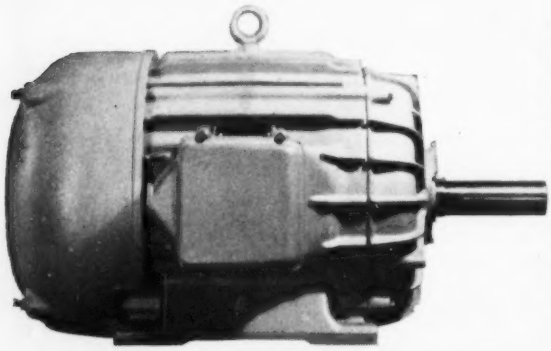
BRYAN DONKIN

Company Limited

CHESTERFIELD Telephone 3153

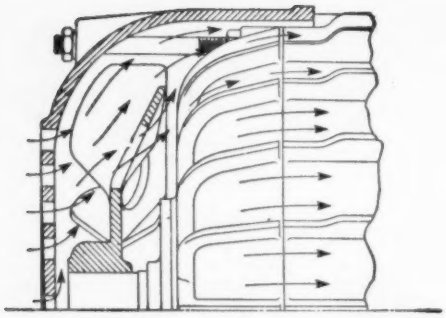
LONDON Telephone ABBey 1096

HIGH PRESSURE GOVERNOR ASSEMBLY



Engineers use the word performance in two senses, a limited one which refers to parameters that can be specified and checked, and a wider, vaguer, but essentially more realistic sense which covers reliability, freedom from trouble, ease of servicing, ready adaptability and many other things. Performance in the first sense is reproducable by any competent manufacturer; it depends on designing to well established principles. Performance in the second sense is the basis of choice between manufacturers. It comes from countless small differences in design that are based on...

This thing called know-how



Take the cooling of a T.E.F.C. motor which is more complex than it looks. The combination of fan and cowl must produce a high velocity airstream that remains close to the stator frame over its entire length, scouring any dead air tending to cling to the ribs. This has been successfully achieved on our new 'KD' range of motors to B.S.2960: Part 2: 1960 resulting in a minimum temperature difference between one end and the other. The fan that does it is worth attention. It is double bladed and the blades on the inner side direct air over the endshield. The scrubbing effect of this air ensures effective cooling of the endshield at the non-driving end.

Crompton Parkinson LIMITED

ELECTRICAL EQUIPMENT

Makers of Electric Motors of all kinds, A.C. and D.C. Generators, B.E.T. Transformers, Switchgear, Cables, Instruments, Lamps, Lighting Equipment, Batteries, Stud Welding Equipment, Traction Equipment, Ceiling Fans.

CROMPTON PARKINSON LTD · CROMPTON HOUSE · ALDWYCH · LONDON WC2

G611

Wellman

announce the completion of their new Crane Erection Shop at their

Globe Lane Works
Dukinfield
Cheshire

In future all Wellman Cranes will be completely erected and subject to initial tests before delivery to the customer commences. This feature of Wellman's service to the client will ensure smooth erection at site and minimum delay, a feature which is particularly important where cranes have to be erected in the vicinity of continuing production; the hindrance will therefore be reduced to a bare minimum.

Our photograph reproduced by kind permission of Messrs. RICHARD THOMAS & BALDWINS LIMITED, shows the first of four 85 TON LADLE CRANES ordered from Wellman by Richard Thomas & Baldwins Ltd. for their important new works at Newport, Monmouthshire—successfully undergoing full load tests.

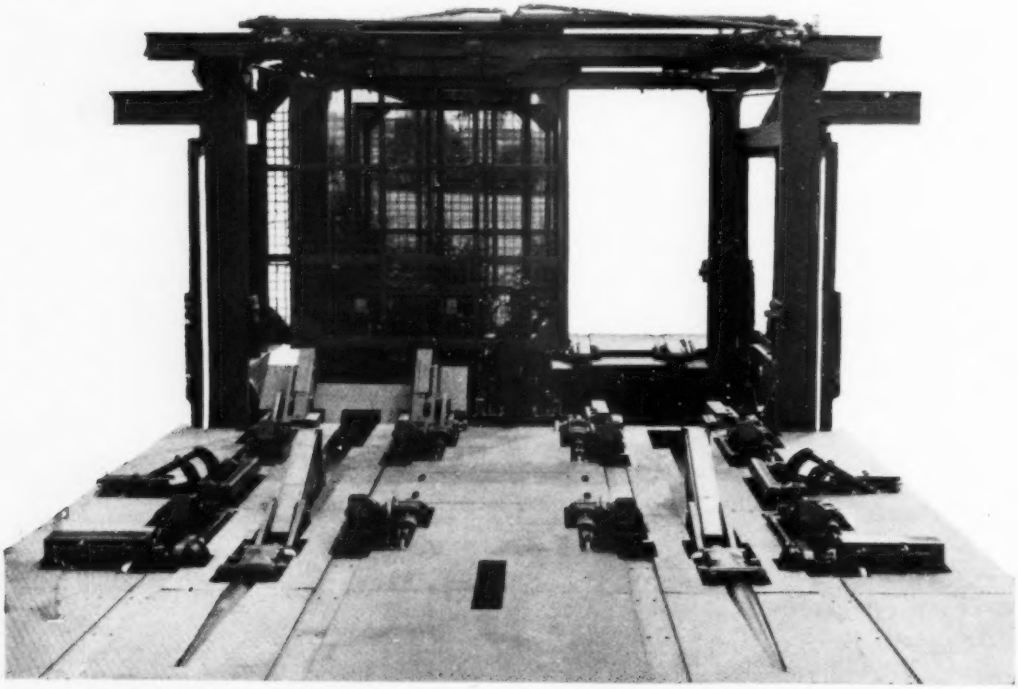
THE WELLMAN SMITH OWEN ENGINEERING CORPORATION LTD

PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1 WORKS DARLASTON, South Staffs, & BELFAST.

WESTINGHOUSE

MINE CAR HANDLING

Proven at home—Chosen for abroad



One of a series of cage decking levels being assembled for test before despatch to the Far East

WESTINGHOUSE BRAKE AND SIGNAL COMPANY LIMITED

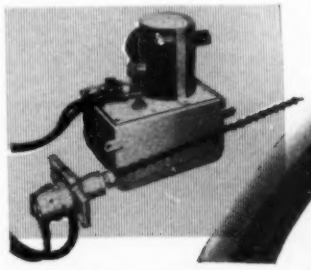
82 York Way, King's Cross, London, N.1. Telephone TER 6432

Sutcliffe

The GLADIATOR HYDRAULIC DRILL

DESIGNED FOR SAFE, COMFORTABLE OPERATION

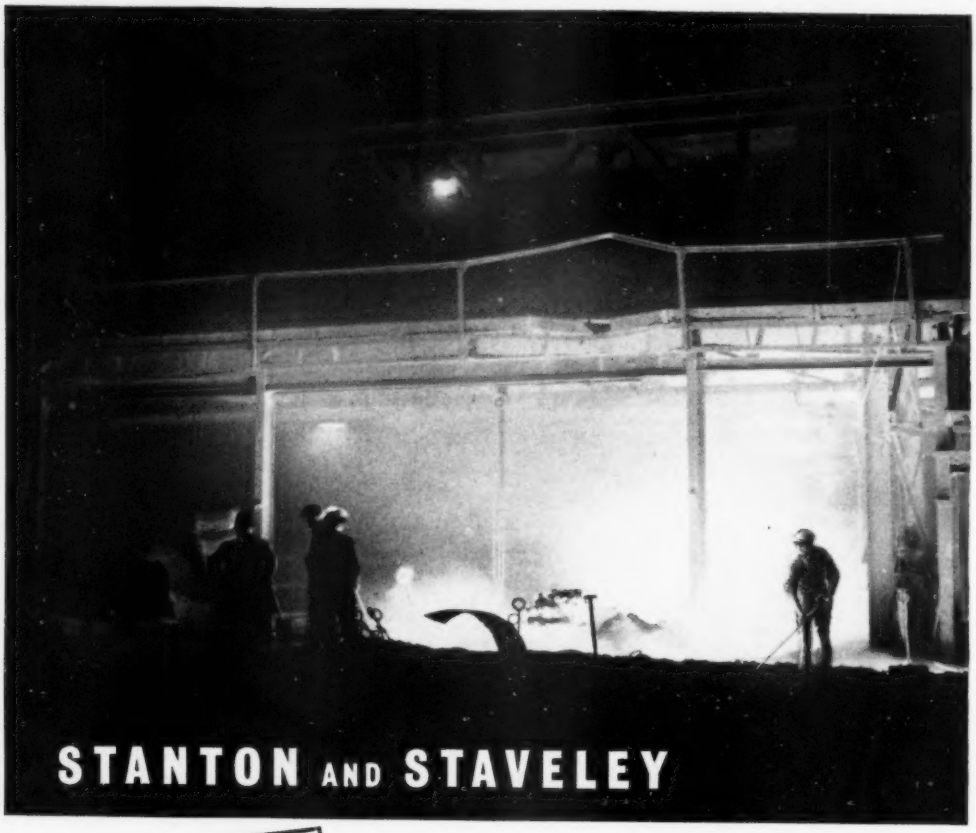
The Gladiator hydraulic drill dispenses with the many problems arising from the use of compressed air or reduced voltage high frequency electrical systems in drilling. This compact unit includes a skid mounted power pack and, despite its high grade iron and steel construction—which eliminates incendive sparking—the coal drilling model weighs only 32 lb. Complete silence in operation and absence of overheating contribute to comfortable working for the operator. Hydraulic leg available for stone drilling. Please write for leaflet ICR188



The Gladiator Drill with power pack comprising 5 h.p. flameproof electric motor, pump and tank.

RS 188

RICHARD SUTCLIFFE LTD · HORBURY · WAKEFIELD



Our Metallurgical Department will gladly assist customers with their problems, and our comprehensive Pig Iron Booklet, will be sent on request.

PIG IRONS

High, medium and low phosphorus foundry irons
High and low phosphorus basic irons
Refined iron

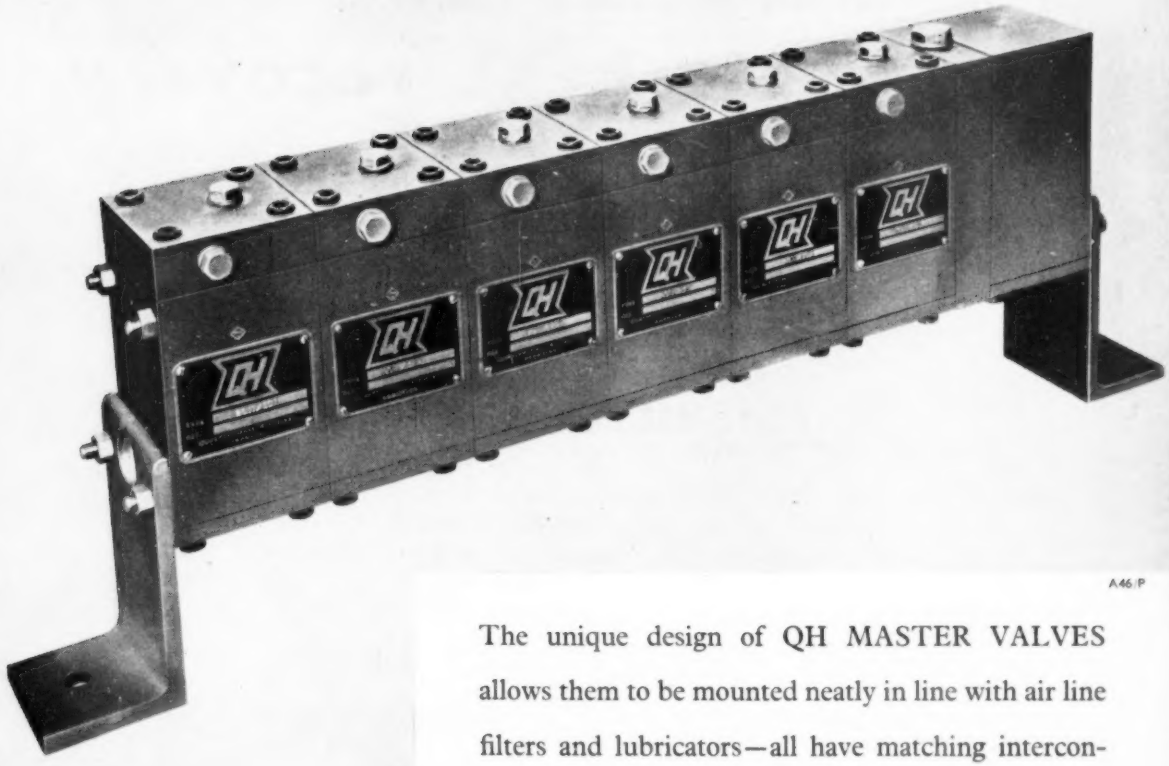
For further particulars please telephone Ilkeston 2121, Ext. 216

with QH

PNEUMATIC MASTER VALVES

(Patent applied for)

your valve panels can be as neat as this



A46/P

The unique design of QH MASTER VALVES allows them to be mounted neatly in line with air line filters and lubricators—all have matching interconnecting pilot and main air ports.

THE HALLMARK QH OF QUALITY

QUALTER HALL

setting new standards in Pneumatic Equipment

For further details write to : QUALTER, HALL & CO. LTD., P.O. Box 8, Railway Foundry, Barnsley

VEW

RECUPERATORS

for waste heat recovery

- STEEL TUBE OR CAST IRON TUBE RECUPERATORS
- RADIATION OR CONVECTION RECUPERATORS
- FOR SMALL OR LARGE FURNACES

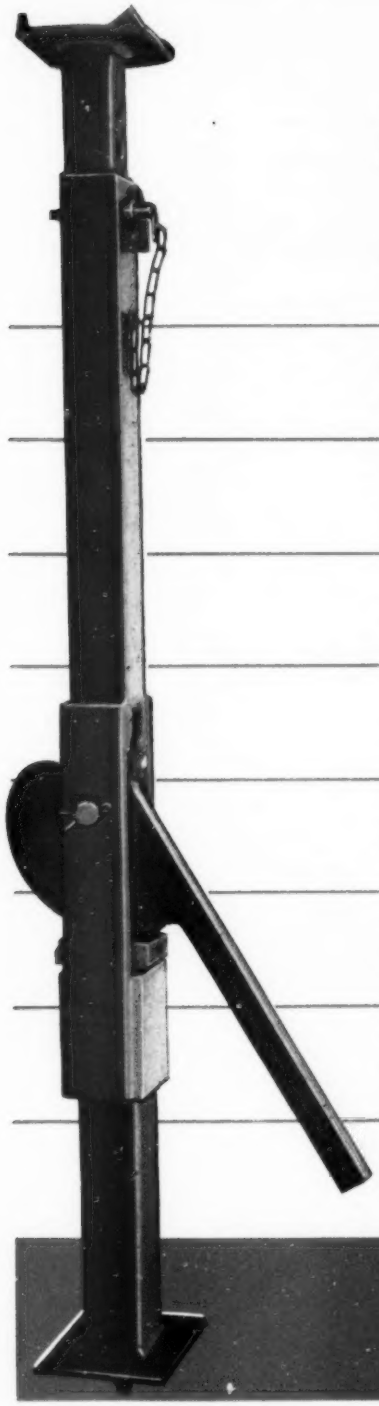
*HEAT TREATMENT FURNACES, SOAKING PITS, MELTING FURNACES, HOT BLAST CUPOLAS—**VEW** HAVE OVER 75 YEARS EXPERIENCE IN HEAT EXCHANGERS AND RECUPERATORS.*

WHY WASTE HEAT? LET US CONSIDER YOUR PROBLEMS

FUEL AND METALLURGICAL PROCESSES LTD.,
21, ST. JAMES ROAD, DUDLEY, Worcs.

Telephone : DUDLEY 54649 and 53751 *Telegrams : FUEMETPROS.*

F. 17



S.M.D. Temporary Safety Prop

Is set by pressing down the cam handle which produces an average setting load of one ton.

Can be set and released in a matter of seconds.

8″ to 12″ of telescopic adjustment.

Prop will withstand loads up to 14 tons.

Made in four sizes covering seam thicknesses 1′-6″ to 7′-6″.

Particularly suitable for use on prop free front faces.

The prop has undergone exhaustive trials both physically and mechanically and is approved for use by the National Coal Board.

PATENT APPLIED FOR

SAFETY IN MINES DEVELOPMENTS LTD.,
2 Leslie Road, Gregory Boulevard,
NOTTINGHAM.

for

FERROUS & NON-FERROUS

CASTINGS

For all Industries

Made
with the experience and skill gained by
generations of craftsmen at the famous

DOWLAIS WORKS

Telephone : Merthyr Tydfil 2371

GUEST KEEN IRON & STEEL WORKS

(Branch of G.K.N. Steel Company Limited)

HEAD OFFICE

East Moors, Cardiff

Telephone : Cardiff 33151

A GAS PRODUCER PLANT IN 7½ MONTHS!

In November 1959 the National Coal Board asked us to build a complete gas producer installation at Manvers Main as quickly as we could. Site work started in December and in August 1960, only 7½ months later, the first producer was put on load.

The gas was urgently required for firing the ovens of the Manvers batteries so that rich gas, which had previously been used for this purpose, could be liberated for sale to the East Midlands Gas Board.

Thanks are due to the N.C.B. for their enthusiastic co-operation in this outstanding achievement.

Photo by courtesy of N.C.B.

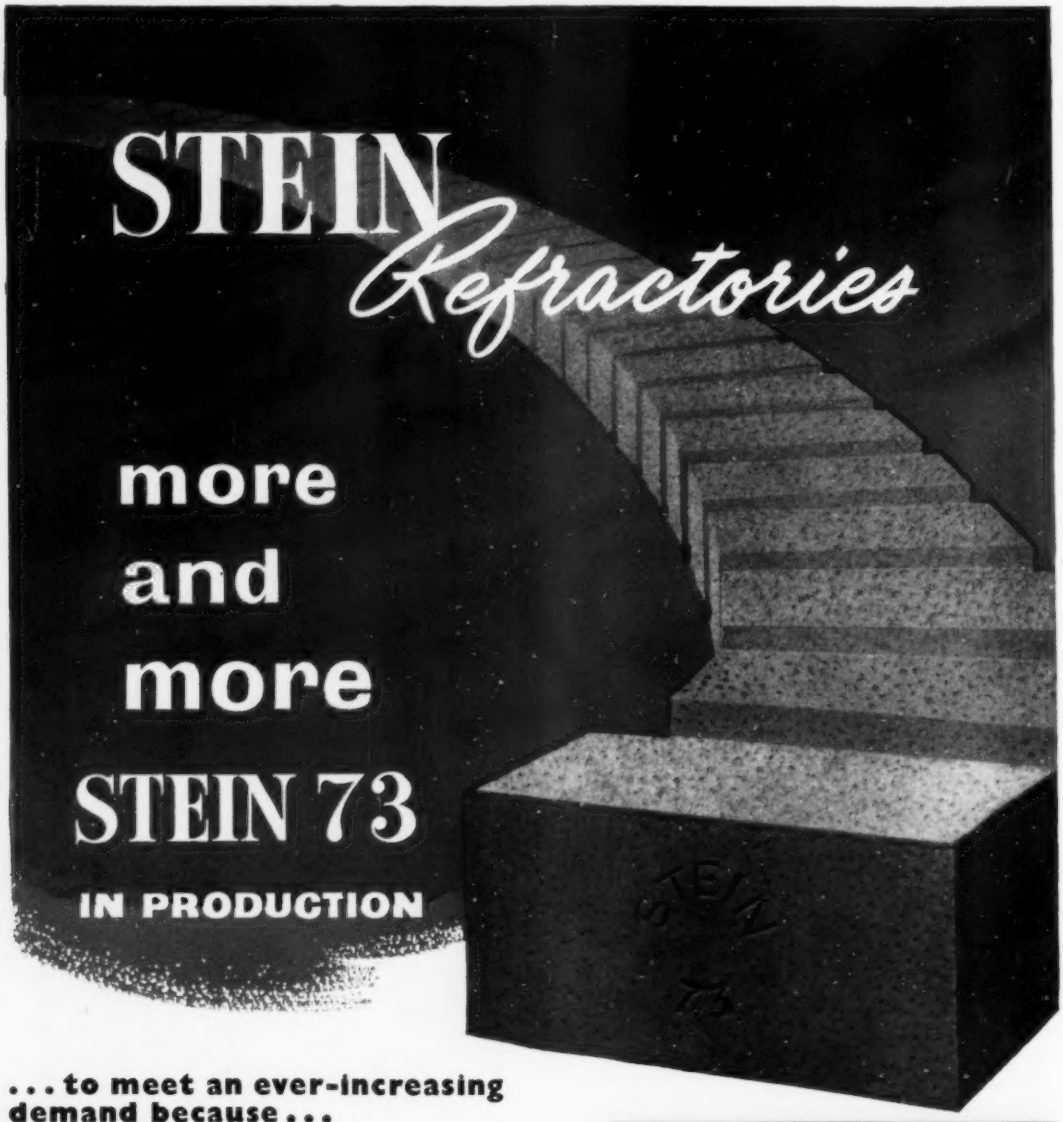
COMPLETE GAS PRODUCER PLANTS BY

Simon-Carves Ltd.

CHEADLE HEATH · STOCKPORT

C3293

STEIN Refractories



. . . to meet an ever-increasing demand because . . .

STEIN 73 offers a proved, exceptional service in positions incurring heavy abrasion and slag attack.

APPLICATIONS: Hearths of Reheating Furnaces Continuous Slab Furnace Hearths • Soaking Pits (Hearth, lower side walls and Ingot Head Level) • Blast Furnace Tap Holes • Boilers (Clinker Line).

You are invited to consult our long experience on all refractory problems. Write, telephone or visit—

APPROXIMATE TECHNICAL DATA

Alumina	83%
Refractoriness — Seger Cone	– 38 = 1850°C
Refractoriness under load 28 lb./in.² (2kg./cm.²)–5% deformation at	1660°C
After Contraction –2 hrs. at:— 1600°C	–0.40%
Apparent Porosity	23%
Cold Crushing Strength	13,000 lb./in.² (914 kg./cm.²)

JOHN G. STEIN & CO. LTD., Bonnybridge, Scotland. **Tel: BANKNOCK 255 (4 lines) 361 & 362**

Vol. 183
No. 4859

IRON & COAL

THE IRON AND COAL TRADES' REVIEW

SEPTEMBER 1
1961

ESTABLISHED 1866
Incorporating "STEEL and IRON" and "COAL"

Organ of the National Association of Colliery Managers and the Association of Colliery Managers in India

Published each Friday

Annual Subscriptions: United Kingdom....52s. Abroad....60s. Payable in advance.

Editor:
F. H. HARLEY

Assistant Editor:
P. E. CARDEN

Metallurgical Editor:
C. W. J. CRAWFORD, A.I.M.

Mining Editor:
H. COOPER, A.M.I.MIN.E.

News Editor:
R. M. HOWSE

Associate Editors:
J. J. CALEY and B. M. DAVEY

District Representatives:

E. G. COLLIS (Southern) Tel.: TRAfalgar 6171

A. D. H. CURRIE (Northern) Tel.: Ringway 2452

E. J. SWEETING (Midlands) Tel.: Plumtree 2585

T. H. SMITH (Scotland and N.-E. England) Tel.: Dumbarton 1046

Production Manager:
R. J. LOVELL

Publisher:
H. J. DWYER

Circulation Manager:
E. T. GRIFFITHS

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LTD.

Directors:
F. BARRINGTON HOOPER *Managing Director*
F. H. HARLEY
JOHN HOOPER
V. C. FAULKNER
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)
Telegraphic Address: "Zacatecas, Rand, London."

In this Issue—

IRON AND STEEL INSTITUTE
Works Visit: Atlas Steels, Limited - - - - page 451

ACCIDENTS IN SCOTTISH MINES
Disappointing Trends in 1960 - - - - - page 457

STAINLESS STEEL MAKING
Desulphurization by Powder Injection - - - page 461

FIREDAMP IGNITION AT GRANVILLE
Mining and Scientific Aspects of Incident - - - page 463

IRONSTONE MINING
Problems of Working and Land Restoration - - page 475

	PAGE
Leading Article: Tinplate	441
New Director of AEI Research	442
Committee on Health in Steel Foundries	442
Iron Castings Output	443
Automation in Steelmaking	443
Passing Thoughts	444
No Polish Coal for Tunnel Cement	444
Coal Under the Sea	445
Board Changes	446
Expansion Prospects of EFCO "Promising"	446
Indian Steel Costs	447
Personal	448
NCB Production Manager for Aberdare Area	448
African Notes	449
Orders Placed	450
£350,000 Precipitation Orders for Simon-Carves	450
Henry Brutcher Translations	455
Continental Roadway Support at Abernant	456
National Coal Board Specifications	456
SMD Temporary Safety Prop	459
Pig-iron and Steel Production	460
Coke Research in 1960	467
Mine-car Loader	468
New Self-contained Breathing Apparatus for Mines	468
Colliery Accidents	468
Metallurgical Progress	469
Annual Statistics of Iron and Steel	472
New Electrolytic Tinning Line at Trostre	472
Davy-United Equipment for BHP	473
Electrically Operated Soaking Pits at SCOW	474
Welding Engineering Exhibition	474
Hollow Ventilating Gummer Bar	477
New Literature	478
Accidents in Mines	479
Lightning Protection for Colliery Structures	481
New Stress-relieving Furnace at Redcar	482
Iron and Steel Trade	483
Exports "Penalized" says Baker Perkins Chief	483
Coalfield News	484
The Coal Trade	485
Wm. Cory Warning on Decline of Seaborne Coal Trade	485
Appointments	486
Making Coke from Nigerian Coal	486
Company News	487
Powell Duffryn May Expand Coal Trade Interests	488
End of Drain on Coal's Manpower?	488
News in Brief	489
New Firm Will Lease Capital Equipment	490
BSA Tools Group is Formed	490
Obituary	492
Effect of Fuel Oil Tax on Walter Somers	492
Imports and Exports of Iron and Steel	494
Exports of British Coal	496
Exports of Coke and Patent Fuel	496
Imports and Exports of Mining Machinery	496
Current Prices of Iron and Steel	498

Photo by permission of Esso Petroleum Co. Ltd. Purfleet, Essex.

H IS FOR HOSES at Esso Petroleum Co., Ltd., Purfleet, Essex

where 300 lengths of Goodyear oil discharge hose are used in the ships exchange layout, the batch blending section of the new lubricating oil warehouse and the road/rail tanker loading bays. Resisting attack by mineral oils, greases and most industrial solvents, Goodyear Oil Hose is immensely strong yet flexible, with a tough cover that stands up to abrasion and gouging. It is one of more than 500 types of Goodyear hose built for specific needs—Write today for full information.

GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tyre & Rubber Company (G.B.) Ltd., Industrial Products Dept., Wolverhampton. Export Enquiries: 17 Stratton Street, London, W.1.

Goodyear products are manufactured in Argentina, Australia, Brazil, Canada, Colombia, Cuba, Eire, England, Germany, India, Indonesia, Japan, Luxembourg, Mexico, N. Zealand, Peru, the Philippines, Scotland, S. Africa, Sweden, the United States, Venezuela. **Branches, Distributors and Dealers throughout the World.**

IRON & COAL
THE IRON AND COAL TRADES REVIEW

Vol. 183 September 1, 1961 No. 4,859

Tinplate

A BRIGHT spot in the economic picture is the production of tinplate in the United Kingdom and its sales at home and abroad. Exports totalled 488,490 tons in 1960, valued at £37,538,000 f.o.b. The markets included the Commonwealth 35.1 per cent., ECSC 14.3 per cent., EFTA 11.5 per cent., and others 39.1 per cent., comprising *inter alia* substantial sales to the Western Hemisphere and the rest of Europe. One company alone accounts for 75 per cent. of British tinplate production, all of which is at present centred in South Wales and Monmouthshire. Productive capacity is expected to rise to some 1,400,000 tons by 1965, and will represent in its entirety modern plant and equipment. This is a distinctive achievement of the industry and provides an example worth emulating.

Electrolytic tinning began in Germany in 1934 and subsequently spread to the US, where an initial plant was installed in 1937 following the acquisition of German patent rights. In the United Kingdom there has been rapid growth in the electrolytic tinning process since the early 1950s, and now 63 per cent. of production is covered by this process, significant economies having been achieved. In West Germany electrolytic tinning accounts for over 50 per cent. of output. In France, to take another instance, out of an annual production in 1960 of 602,000 tons, 304,000 tons was electrolytic tinplate.

Today, United Kingdom tinplate is competitive in world markets and a substantial percentage of the output is being exported. There is no escaping the fact that in the European area a considerable volume of local plant is being installed, and that the existence of two trading blocks may give rise to further difficulties. It has been argued by the Steel Company of Wales that the industry must continue to maintain its competitive position in Europe and that every advantage should be taken of the cheapest possible fuels available. With this in mind the company lodged an application for a licence to import coking coal from America, where the price differential is claimed to be as much as 30s. a ton. The application was refused.

The French output of tinplate largely derives from two companies—Sollac, and Etablissements J. J. Carnaud et Forges de Basse-Indre. The former produced 289,000 tons (all electrolytic) in 1960, while the latter produced 196,000 tons. Basse-Indre has just installed an electrolytic line for 38-in. strip including a cold reducing mill and a tinning capacity of 120,000 tons per annum. Total tinning capacity is eventually expected to reach 180,000 tons per annum. Other companies include De Wendel et Cie, Forges d'Hennebont, and Sidelon. Under the fourth modernization and development programme running from 1962 to 1965 a further expansion in tinplate capacity is foreseen. Although there has been a sharp rise in home consumption in recent years, exports have been running at the very high level of 386,000 tons, equivalent to 64 per cent. of total output. Imports reached 72,000 tons in 1960.

West Germany is the third largest consumer of tinplate in the world. Production reached just over 400,000 tons in 1960, necessitating substantial imports—107,000 tons—but at the same time 71,000 tons were exported. The largest manufacturer is Stahl-und Walzerke Rasselstein/Andermach, AG, with an output approximating 50 per cent. of the country's total. A new installation of electric tinning plant producing 48,000 tons per annum should lift the company's capacity significantly by 1962. If all current development programmes are completed as scheduled, the capacity of West German plants should rise by some 50 per cent. during the next few years and the country may become a net exporter of tinplate. Other leading companies in the industry include Hüttenwerke Siegerland, Hoesch, Klöckner, Der Dillinger Hüttenwerke, and Hüttenwerke Salzgitter.

In Italy, production of 167,000 tons (58,000 tons electrolytic tinning and 109,000 tons hot dip) was recorded last year. The country's output is centred in three enterprises—Cornigliano, Geona, Cantieri Metallurgici Italiani, chiefly at Naples, and La Magona d'Italia at Piombino. Tinplate production on a large scale is scheduled to be undertaken at a new integrated steelworks at Taranto by Societa Ilva Alti Forni E Acciaierie d'Italia. This should advance the country's capacity significantly. At present production is roughly divided equally between electrolytic and hot dip. Imports are substantial—77,000 tons in 1960 compared with exports of 37,000 tons.

In Belgium and the Netherlands, considerable capacity has been planned to cope with the growing requirements of the domestic market and export. While Britain retains the lead, care should be taken not to lose it. Competitive advantage depends largely on cost advantage, and nothing perhaps could contribute more than a reduction of basic costs and relative stability of wage demands in the economy generally.

Copies of the Index to Vol. 182 are obtainable (post free) on application to the Publisher.

New Director of AEI Research

NEW post of director of research has been created by Associated Electrical Industries, Limited, for the direct supervision of its four research centres at Aldermaston, Manchester, Harlow, and Rugby. Appointed to the post is Mr. L. J. Davies, previously director of research of AEI (Rugby), Limited, who also becomes a non-executive director of the Rugby company's board.

MR. L. J. DAVIES

Mr. Davies, who has been research director at Rugby for the last 16 years, was closely connected with the introduction into this country of the fluorescent lamp, and in a form that made it suitable for production for factory lighting during the war. A past president of the Illuminating Engineering Society, he is a member of Council of the British Electrical and Allied Industries Research Association, and chairman of the board of governors of Rugby College of Engineering and Technology.

AEI states that the new appointment is aimed at ensuring coherent research effort by the company and making the most effective use of the resources and scientific ability in its various laboratories.

Dr. J. E. Stanworth has succeeded Mr. Davies as director of research of AEI (Rugby). Dr. Stanworth joined the British Thomson-Houston Company, Limited, as glass technologist in 1937, and in recent years has been responsible for supervising research into new materials, particularly in the field of semiconductors, materials for nuclear energy power reactors, lamps, high temperature materials, and hard materials.

The other directors of research laboratories are: Dr. T. E. Alibone (Aldermaston); Dr. J. M. Dodds (Manchester); and Dr. M. E. Haine (Harlow).

Development of Heavy Industry Urged for the North-East

FUTURE long-term prosperity of the North East depends on the further development of basic heavy industries such as iron and steel, chemicals, electrical machinery and engineering, which could to a large extent offset the decline in coalmining and shipbuilding, states Mr. W. R. Snaith, senior lecturer in economics at the Newcastle College of Commerce, in a review of industrial conditions in the area prepared for the North East Industrial and Development Association.

The report warns against industrial diversification for its own sake, and says the aim should be to foster natural economic growth which benefits from the specialized resources of the North East rather than a narrowly based policy of taking work to pockets of unemployment.

Committee on Health in Steel Foundries

MINISTER of Labour, Mr. John Hare, has reappointed the Joint Standing Committee on Health, Safety, and Welfare in Steel Foundries. The function of the committee, which has been appointed for three years, is to advise the Minister on matters affecting the health, safety and welfare of persons employed in steel foundries. It replaces and will continue the work of the Joint Standing Committee on Conditions in Steel Foundries set up by the Chief Inspector of Factories in 1952.

Mr. H. Woods, Deputy Chief Inspector of Factories, has been appointed chairman and the other members are:—Mr. W. Prince, Mr. R. H. Ward (Amalgamated Union of Foundry Workers); Dr. A. H. Sully (British Steel Castings Research Association); Mr. J. Bolton, Mr. D. Brown, Mr. A. G. Gilbertson, Mr. R. F. Horton, and Mr. G. R. Shaw (British Steel Founders' Association); Dr. W. D. Buchanan (deputy Senior Medical Inspector of Factories); Mr. J. Gardner (independent member); Sir Thomas Williamson (Iron and Steel Board); Mr. E. Tullock (Iron, Steel and Metal Dressers and Kindred Trades Society). The secretary is Mr. W. B. Lawrie, Engineering Inspector of Factories.

The work of a Dust in Steel Foundries Committee set up in 1943, which published its first report in 1944 and its second report in 1951, was continued and extended by a committee set up in 1952, whose report was published on August 14. The new Joint Standing Committee will, therefore, inherit a wide field of experimental work in various stages of completion. The subjects range over moulding practice, hot fettling methods, noise, X-ray surveys, the toxicity of dust, furnace fumes, the elimination of dust, the control of dust by local exhaust ventilation, respirators, dust estimations in foundries, and the assessment of the results.

Ergonomics in Industry Now Widely Recognized

ERGONOMICS, the study of man in relation to his working environment, was now widely recognized in industry for its importance in the rational design of machinery and in the control of the immediate climatic environment in which tasks needed to be carried out, said Sir Wilfred Le Gros Clark in his presidential address to the annual meeting of the British Association for the Advancement of Science at Norwich on Wednesday.

Sir Wilfred maintained that international co-operation was characteristic of science. The Ergonomics Research Society, because of the importance of its work in so many fields of economic importance, attracted membership from individual scientists all over the world.

The atomic physicist, Sir John Cockcroft, FRS, was elected president of the Association for 1961-62. After the war, as director of research at Harwell, Sir John was responsible for much of the fundamental work of Britain's atomic energy programme. His many honours include the Nobel Prize, the Royal Medal of the Royal Society, the 1961 Atoms for Peace Prize, and the Order of Merit.

Iron Castings Output

FIRM TRADE BY FOUNDRIES IN SECOND QUARTER

PRODUCTION of iron castings in the second quarter of 1961 was 1,007,000 tons, compared with 1,026,000 tons in the previous quarter and 1,006,000 tons in the second quarter of 1960, states the Iron and Steel Board. Commenting on the figures, the Joint Iron Council points out that the second quarter included both the Easter and Whitsun holidays, which together reduced the number of working days by 2 to 3 per cent. For this reason, the fall in output compared with the previous quarter does not imply a reduced rate of production.

The Council states that the rate of production was generally well maintained in the second quarter, and trade has been steady. Such changes as are recorded for the different sections of the industry are marginal.

Outputs in the various districts in the quarter, with the figure for the second quarter of 1960 in parentheses, were:—Eastern, South-Eastern (including London), Southern and South-Western, 116,210 (118,140) tons; Midland, 219,640 (221,010) tons; North Midland, 200,480 (213,390) tons; East and West Ridings, 95,380 (90,370) tons; North-Western, 100,390 (96,460) tons; Northern, 111,580 (110,090) tons; Scotland and Northern Ireland, 101,030 (93,240) tons; Wales, 62,320 (63,610) tons.

Automobile Sections Improved

While the automobile ironfoundries again improved their performance, states the Iron Council, they still fell somewhat short of the high peak of the corresponding period of last year. This section has benefited greatly from the firm demand for commercial vehicles and tractors.

The engineering section edged forward under the influence of the high investment demand for plant and machinery. The building section maintained an output above that of the corresponding period last year, but mainly as a result of a slight easing of demand for domestic equipment it failed to equal that of the previous quarter. The steel industry's rate of output continued at a level somewhat lower than last year, and consequently the demand for ingot moulds was slightly less.

The rate of production of pressure pipes and castings for railway equipment was well maintained, compared with the previous quarter, although that of pressure pipes was significantly down on the corresponding figure of a year ago.

Detailed figures of production in the various industrial sections in the second quarter, with the percentage increase or decrease over the first quarter in parentheses, were:—Automobile (including tractors), 189,000 tons (+1.4 per cent.); engineering (including machine tools, textile machinery, electrical, shipbuilding, etc.), 340,500 tons (−0.5 per cent.); building and domestic, 142,200 tons (−5.8 per cent.); pressure pipes and fittings, 134,000 tons (−1.0 per cent.); ingot moulds (mainly for the steel industry), 128,600 tons (−6.9 per cent.); railway equipment, 72,700 tons (−0.4 per cent.).

The number employed in the ironfounding industry at the end of June, 1961, was 130,700. This is 1,100 less than three months ago, but 800 more than at the end of June, 1960.

Automation in Steelmaking

COMPUTER system to control the world's largest basic oxygen steel furnace plant at Detroit, and which will take into account all the characteristics of the raw material and the furnace, as well as the specification for the end product, is the subject of an order received by Thompson Ramo Wooldridge Inc. of Los Angeles. The company, with the General Electric Company, Limited, is jointly interested in International Systems Control, Limited, Wembley (Middx).

Dr. D. N. Truscott, general manager of ISC, explained that the computer will determine the amount of raw materials required and prescribe the amounts and types of additives necessary to produce a given quantity of finished ingots of the right specifications. It then takes care of the furnace process, controlling the heat generated by adjusting the flow rate and duration of the oxygen blow. Besides maintaining a consistent product of top quality this precise control also ensures the minimum consumption of raw materials and oxygen.

From the data which the computer automatically records, a close relationship between furnace conditions and finished ingot characteristics can be drawn up, for use in determining the optimum conditions for subsequent batches. At the same time the computer's programme can be automatically revised as more is learnt about the furnace operation.

The whole of the information on this installation will shortly be available for use by ISC to be applied to similar plants in the UK, the EFTA countries, and the Commonwealth.

Special Scammell Tractor for Steelworks

EQUIPPED with power-assisted steering, a special "Highwayman" tractor, built by Scammell Lorries, Limited, Watford (Herts), is being used at the Sheffield works of Hadfields, Limited, to haul ladles of molten steel on specially-designed trailers from the smelting shop to the pouring bay.

Power-assisted steering is essential for the very accurate manœuvring necessary in this type of haulage, which involves a gross train weight of 52 tons.

SUPPLY AND INSTALLATION of machinery for a new grinding and mixing plant at the Bovey Tracey (Devon) feed mill of Wyatt & Bruce, Limited, is to be carried out by Henry Simon, Limited.

Passing Thoughts . . .

CLEARLY no one wants to demoralize the [Coal] Board when a new chairman has just been appointed; and any contraction in the industry would have to be planned carefully, remembering that mines that are closed down cannot easily be reopened. But the argument of principle is clear. Many of the board's mines are already running at a loss; these should be closed as quickly as possible and way made for a margin of imports, if and when the case for these on cost grounds has been clearly proved.—Financial Times.

In the end it will be improved appliances to take the work out of solid fuel heating, rather than easy ways of paying, that will settle coal's chances of making a come-back in domestic heating.—The Economist.

During his lifetime Mr. Abe Moffat, the retiring president [of the Scottish Area of the NUM], has seen great improvements in working conditions which he has helped to win. But he is leaving the industry with its future as insecure as it has ever been. The old approach of exacting the maximum the situation permits will not answer the needs of the next decade.—The Scotsman.

Our roads cluttered up with heavy lorries are becoming a nightmare. . . . It is heartbreaking to see loads like coal and steel being carried by road.—MR. H. A. SHORT *who retires this week from the post of North-east general manager of British Railways.*

In my judgment British industry will view with great interest any proposal to build a bridge across the Channel. . . . Unless a commercial traveller from Birmingham can throw his samples into the back of a car and travel to any point of the Continent just as easily as a traveller from Düsseldorf, he is suffering under a terrific handicap.—MR. DAVID BROWN, chairman and managing director of David Brown Corporation, Limited, in a letter to The Times.

Some British shipyards are more modern than any in the world and it is unfair to compare the worst in this country with the best abroad.—MR. KENNETH DOUGLAS, *managing director of Austin & Pickersgill, Limited, shipbuilders, of Sunderland.*

I should have thought that the Minister's department [the Board of Trade] might publicize the balance of trade at regular intervals between Britain and countries overseas. This would enable our manufacturers to see where more aggressive action was required in the export field and at the same time encourage importers to seek other sources of supply and so assist in maintaining an even balance of trade with all parts of the world.—MR. HAROLD CROWTHER, chairman of Baker Perkins (Exports), Limited.

Mr. F. Jackson, head of a Manchester firm, said that women helpers would have to be called in to deal with four tons of bingo cards—a million cards altogether—which were at present being produced. They will assemble complete sets by walking round and round 334 separate piles of differently numbered cards picking up one card from each pile on every circuit.—The Times.

Your reviewer of the Coal Board building [in Edinburgh] is to be congratulated on his imagination in describing what looks like an essentially box-like structure. In his words it is "given elevational expression by the repetitive structural supporting members which . . . act as a foil to the strong horizontality of the fenestration." Such verbiage effectively disguises what may appear to many people as a very dull looking building.—Letter in the Scotsman.

Everything has tended to strengthen our conviction that, on balance, nothing but good, so far as the machine tool industry is concerned, can result from Great Britain's joining the Common Market. —MR. ROBERT ASQUITH, *chairman and joint managing director of the William Asquith, Limited, group.*

It is too late to modify economically many of the existing noise producing devices . . . but, by training more acoustical engineers and by giving other engineers at least a notion of the elements of acoustics it should be possible to eliminate excessive noise from the world of tomorrow.—Letter in the Glasgow Herald.

No Polish Coal for Tunnel Cement

APPLICATION by the Tunnel Portland Cement Company, Limited, for a licence to import Polish coal has been turned down by the Government. It is understood that a decision to this effect was sent from the Ministry of Power early this week.

Mr. N. M. Jensen, chairman of the company, complained last week that the introduction of a fuel oil tax in April and the additional rise which resulted from the "little Budget" had meant a considerable increase in production costs. He claimed that when the company asked the National Coal Board to supply suitable coal for some of its inland works the board's reply was "far from satisfactory."

The board, however, has stated that it had made efforts to supply the company with satisfactory alternatives and could supply the same grades as before to the Essex plant if it were asked.

More NCB Apprenticeships During "Bulge" Period

DURING the next three years the National Coal Board is to increase by 40 per cent. the number of craft apprenticeships available to boys leaving school during the "bulge" period of 1961-63. The additional apprenticeships are required, says the board, to meet the large increase in mechanization planned over the next few years, and will be open to suitable boys already working in the industry as well as to school-leavers.

The National Apprenticeships Scheme is designed to train boys to become skilled mechanics and electricians at collieries, central workshops, and other board plants, and covers practical courses of instruction, planned practical experience, and technical education with day release. More than 3,400 apprenticeships will be offered in the years 1961, 1962, and 1963, as compared with some 2,400 in 1960, although the number of opportunities will vary according to requirements in different parts of the country.

CANADIAN STEEL ingot production in the week ended August 5 amounted to 122,810 tons, an increase of 3.8 per cent. over the preceding week's total of 118,305 tons. Output in the comparable 1960 period was 79,299 tons.

Coal Under the Sea

300,000,000 TONS SUITABLE FOR POWER STATIONS

AFTER visiting the National Coal Board's seagoing boring tower which in the past three years has proved available coal reserves of at least 300,000,000 tons under the sea between Hartlepools and the Tyne, Lord Robens, NCB chairman, said last Friday: "It is 300,000,000 tons of additional wealth to Britain, coal of a type very suitable for power stations. If we exploit these reserves with efficiency, we can build our own customer in the form of an electricity station sited on the coalfield. At full capacity, this could take 5,000,000 tons a year for at least 20 years."

Within the next few weeks, said Lord Robens, the Durham Divisional Coal Board would have completed an analysis of the whole situation and would be able to say whether it could produce the coal at a price which would be economically right to get a power station in Durham.

"If we can so produce it," he added, "I have been personally assured by Sir Christopher Hinton, the chairman, of the fullest co-operation from the Central Electricity Generating Board."

Doubled Demand in 10 Years

Lord Robens was addressing miners' representatives at Sunderland. Holding up a nut of coal which had been produced by the tower by boring 2,000 ft. into the sea bed, he declared: "On this, the future of the Durham coalfield depends. This coal is perfect for power stations."

He said that technical improvements in the steel industry had resulted in a decline in the demand for Durham coking coal because in the best furnaces a ton of steel now needed only 11 cwt. of metallurgical coke whereas 25 cwt. was needed at one time. "But as the demand for coking coal for steel goes down we are determined not to sit back, and are asking where else we can get customers to buy this coal."

The answer, he said, was power stations. British power stations were expected almost to double their demand for coal from 55,000,000 tons to 100,000,000 tons a year in 10 years. The power stations, however, had got to be efficient and to be sited where the coal could be got with very little freight charge.

Lord Robens made the trip to the boring tower, moored on the sea bed nearly three miles off the mouth of the Tyne, in a converted trawler. The tower, which began its task of proving reserves off the Durham coast three years ago, has now completed its ninth borehole and it is intended to bore about six further holes, mainly to prove the Westoe field, off the mouth of the Tyne, in more detail and to explore the virgin undersea coalfield east of the present workings at Vane Tempest, Dawdon, and Easington. This, it is estimated, will take a further two years.

The first two boreholes were drilled to prove reserves of high-quality coal beyond the existing workings at Blackhall and Horden. Blackhall colliery lies at the southern end of the Durham coalfield and a short distance farther south the coal seams gradually rise and finally incrop against the base of the permian magnesian limestone, terminating the field. Drilling had to find out not only if coal were present in workable thickness, but also if it were far enough away from the base of the water-bearing limestone to make it safely workable.

Results obtained from the two bores, each over 2,000 ft. in depth, indicated that at least eight coal seams not less than 3-ft. thick would be accessible for a distance of two miles beyond the present working limits. Among them were the Busty and Brockwell, which are not workable inland for about 10 miles west of the coastline, but reappear in minable thickness undersea.

The tower later moved to positions off the mouth of the River Wear, where three separate boreholes proved the existence of six workable coals and additionally, confirmed that the strata containing the coal seams was folded into the form of a basin so that in the eastern part of the area the seams were about 600 ft. more shallow than farther inshore.

For about the last 18 months, the tower's operations have been centred off the mouth of the Tyne, and here four separate drills have yielded valuable geological information on the coal reserves for the new Westoe Colliery, near South Shields. A very rich field of coal has been proved, and at least six seams of excellent quality, ranging up to 9 ft. thick—an unusual height for Durham which is noted for low seams—have been verified at depths convenient for mining operations.

The depths of the nine boreholes sunk to date vary from 1,700 ft. to 2,800 ft., and in almost every case the large diameter diamond bits have cut through up to 800 ft. of hard limestone before entering the coal-bearing strata.

Scottish NCB's New Offices

NEW building recently completed in Lauriston Place, Edinburgh, for the Scottish Divisional Coal Board as its headquarters offices, fulfils an undertaking given by the board to the City Council and is the first step towards the planned redevelopment of part of the town in accordance with contemporary standards. It replaces a group of houses which have been occupied by the NCB since the late 1940s.

Because of the need for economy no attempt was made to embellish the building which took 21 months to complete and worked out at about £3 3s. 8d. per sq. ft. of floor space.

MANUFACTURERS of electrical power tools, Black & Decker, Limited, has acquired a leading Italian company in this field, Imobiliare Civatese S.p.A., and its manufacturing subsidiary, Star Utensili Electrici S.p.A. The Star plant is located at Civate, near Lake Como, and sales of Star products this year are estimated to total £750,000. The deal will be accomplished by an exchange of Black & Decker common stock for the capital of Star.

Board Changes

Technical Director for Sutcliffe Hydraulics

MANAGER for the past seven years of the development department of Richard Sutcliffe, Limited, mining machinery and mechanical handling equipment manufacturers, of Horbury, near Wakefield (Yorks), Mr. Leslie Baines has been appointed technical and sales director of the subsidiary, SUTCLIFFE HYDRAULICS, LIMITED, Whitwood, Castleford.

MR. LESLIE BAINES

Mr. Baines has been with Richard Sutcliffe for 11 years, and before this he was chief draughtsman with Hyland, Limited, Wakefield. He is the co-author of a paper "Trials with Hydraulic Armoured Flexible Conveyors" presented recently to the Institution of Mining Engineers, and while with Richard Sutcliffe he has been prominent in the development of hydraulics in the mining industry.

In his new capacity with Sutcliffe Hydraulics, Mr. Baines will continue his work on the development of hydraulic equipment for the mining industry, and will also be responsible for the development and sales of the full range of such equipment now made by the company.

STEEL BROS. & COMPANY, LIMITED—Mr. C. H. Elliott has been appointed a director.

DUSSEK BROS. & COMPANY, LIMITED—Mr. P. G. Simonis has been appointed a director.

ROTHERHAM & SONS, LIMITED—Mr. W. L. G. Nicoll has been appointed to the board as sales director.

UNIVERSAL METAL PRODUCTS, LIMITED—Mr. Maurice Biddulph, technical manager, has been appointed technical director.

FAIRBAIRN LAWSON COMBE BARBOUR, LIMITED—Mr. J. P. M. Ferrier has been co-opted to the board as an additional director.

WORSLEY MESNES IRONWORKS, LIMITED—Mr. J. B. Forbes has been appointed a director. Mr. J. Turner has resigned his directorship.

BLUEMEL BROS., LIMITED—Mr. E. J. Scott has been appointed chairman and managing director in succession to the late Mr. F. W. Bluemel.

ADA (HALIFAX), LIMITED—Mr. Henry Chisholm has been appointed chairman to succeed Lt.-Col. W. D. Gibbs, who has retired from the board.

BOWDEN (ENGINEERS), LIMITED—Mr. D. C. Moore-Brabazon has been appointed to the board of the company, a subsidiary of Bowden (Holdings), Limited.

EUTECTIC WELDING ALLOYS COMPANY, LIMITED—Mr. Robert Butler has been appointed managing director. He was previously a director of the Quasi-Arc Company, Limited.

INTERNATIONAL HARVESTER COMPANY OF GREAT BRITAIN, LIMITED—Mr. James R. Boerger has been appointed director of manufacturing succeeding Mr. G. Gordon Davis who has returned to the US. He also joins the board.

Expansion Prospects of EFCO "Promising"

LAST five months' trading by EFCO, Limited, engineering and metallurgical group, indicates little variation in the value of orders received, while the three recently-formed associated companies appear to be approaching a profitable basis, says Mr. D. F. Campbell, chairman, in his annual statement. He describes the prospect of further expansion by the group as "promising." In June, shareholders were told that the value of group orders was higher than 12 months before, and that this should compensate for the tendency toward lower margins.

The joint company formed with Acme Manufacturing Company, of Detroit, completed its first year's trading with a satisfactory number of machines installed, and its operations should "increase rapidly." The present order-book of Birlec-Efco (Melting), Limited, formed 2½ years ago in partnership with AEI, now extends to several million pounds, and this year a modest profit is expected with "excellent prospects" for subsequent years.

The group's furnace business is progressing well, says the chairman. There was a large volume of unfilled orders at the financial year ended March 31, 1961, and the order intake since has been quite satisfactory. The engineering side of the Electro-Chemical Engineering subsidiary received and despatched a record volume of equipment orders, and at the year end there was still a considerable volume of engineering export orders in course of manufacture.

As previously reported, group profit before tax, for 1960-61 increased to £332,805 (£289,881).

British Firm to Make Carburized Rods for Rock Drilling

NEW company has been set up to produce, for the first time in the UK, carburized rods for rock drilling. The name of the company is Bedford Rock Drill Components, Limited, and it will be situated on a site next to the main Lion Works of John Bedford & Sons, Limited, steel manufacturers, of Sheffield. The two companies will in future work in close association. Plant for the new firm is now approaching completion and it is hoped to begin production this month. Directors of the company are: Mr. C. E. Holstrom (chairman); Mr. A. Sellars (managing director); Mr. D. J. Haggie, Mr. R. Gray, and Mr. E. Ogden.

Bedford Rock Drill Components, it is stated, is only the fourth concern in the world to undertake the production of these carburized rods, the three existing plants being in Denver, USA, Johannesburg, and Canada.

FALL IN TEES IMPORTS OF IRON ORE

IMPORTS of iron ore into the UK, which are usually at their height at this time of the year, have been curtailed. Arrivals at the Tees in July amounted to 231,484 tons, a drop of over 50,000 tons compared with June, while imports at the Hartlepools of 41,497 tons were 67,000 tons down on the previous month.

For August, an increase to 259,000 tons was expected in the Tees, but no ore at all was booked for delivery at Hartlepools.

Indian Steel Costs

Burden of Enforced Pay Increases

REVIEWING conditions in the steel industry in India, Sir Biren Mookerjee, chairman of the Indian Iron & Steel Company, Limited, says that while much of the persistent rise in works costs is due to severe Government revenue imposts inflicted on the industry, the most serious single factor is the persistent and inflationary rise in labour costs. "If the Government fails to stabilize labour costs at this juncture, it will perhaps be impossible for the country even to be in a position to export any sizeable quantity of steel," he warns.

Sir Biren, in his statement for the year to March 31, 1961, says that while the labour position in the Indian steel industry is better than that in most other industries, the country suffers from the "malignant disease" of the system of automatic annual increments and enforced increases in the rates of wages, allowances and incentive bonus, which is thwarting attempts to stabilize costs.

Coupled with this was the question of manning. In the company's own case, it was at present compelled to employ at least twice as many men as were necessary, having regard to the almost complete mechanization of its plant, and to keep them in employment irrespective of the company's needs and costs.

Production Difficulties

Sir Biren states that he is not suggesting the imposition of a ceiling on the income of any workman, but in effect a ceiling on the labour cost per ton of output. "If the industry is to continue to suffer from over-manning and low productive effort, then wages cannot be increased without inflation and loss of competitive power in world markets."

He repeats the warning made in the report of the directors that, while the company's production of iron for the year, at 1,160,576 metric tons, and of steel ingots at 914,159 tons was an improvement on the previous year, there were no grounds for complacency. With the serious deterioration in the quality of raw materials, there could under existing conditions be no possibility of achieving the output envisaged at the time the expansion of the company's plant was planned, and serious difficulties were foreseen even in maintaining production at the 1960/61 level. The main difficulty was the extremely high and varying ash content in presently available metallurgical coal, coupled with erratic supplies and the fact that owing to the transport position the company's stock of coal was diminishing so severely that unless the position rapidly improved, it would be forced to curtail the production of iron.

The plea of operational executives was that if the quality of raw materials must be bad, then at least it should be regularly bad, so that whatever the difficulties some measure of consistency of operation could be achieved. The erratic transport position, however, effectively precluded this and with the daily fluctuations it was becoming impossible to produce a standard grade of iron, a position further prejudiced by the severe deterioration in the quality of limestone supplies.

Until the raw material position improved, he feared that for some years to come operation must be carried on under extremely difficult and restrictive conditions. In fact, before any improvement took place, the position must deteriorate further for there remained three more blast furnaces to be brought into operation in the public sector.

Dealing with the need to increase exports of Indian steel, Sir Biren says that the Government at present allows an export rebate of about Rs. 53 per metric ton of finished steel equivalent to the excise duty levied on the steel ingot, but even after taking advantage of the rebate, the Indian producer cannot compete with other prominent steel exporting countries such as the UK, Japan, Belgium, and Germany.

To strengthen the position of the Indian producer, he advocates the adoption of measures by the Government to enable producers to reduce production costs under the present system. These would include improvement of transport facilities, establishment of coal washeries, stabilization of labour costs, and regularization of the supply of raw materials and fluxes. Further incentives might be offered by way of rebate in the railway freight, remission of certain levies and taxes imposed by the State and Central Governments, and reduction in the Port Commissioners' charges. Exporters should also be allowed to retain any additional money they were able to realize by virtue of their business acumen over and above the incentives offered by the Government.

Sir Biren says that the present shortage of transport in the country is one of the most serious causes standing in the way of achievement of planned targets for industry, impairing productive efficiency, and raising all production costs. Any shortage, interruption, or disorder in the transportation and delivery to the works of necessary materials in proper sequence lead to heavy loss of production, and it was the company's bitter experience that raw materials were not being received at the works to scheduled programme because of the shortage of railway rolling stock.

It was for the Government to take immediate measures to make good the shortage of wagons in general, and particularly wagons of the right type for the steel industry. In this connection, he understood that some of the wagon manufacturing concerns were working only to 40 per cent. capacity due to shortage of matching steel and some bought out steel castings such as axle boxes. This was a position which in the national interest should obviously be corrected.

TO ASSIST smaller firms in the problems of exporting, the north midland regional council of the Federation of British Industries has organized a panel of experts consisting of 14 members covering the principal industries in the north midlands.

Personal

Doyen of NACM Celebrates Diamond Wedding

NOW in his 86th year, Mr. HERBERT PERKIN, who celebrated his diamond wedding on Monday, can look back over a long and distinguished career in coal mining. Apprenticed to Prof. Arnold Lupton, Mr. Perkin afterwards joined Prof. Lupton's staff in an extensive and varied practice in the mining industry. In 1907 he was appointed mining engineer to the Great Central Railway Company, Limited, and was seconded to the Mines Department during the first world war. Subsequently he joined its permanent staff and acted as liaison with the Ministry of Munitions for colliery supplies.

After the war, Mr. Perkin spent some years in dealing with the technical side of claims for deferred repairs and development during the period of mines control. On leaving the Ministry for private practice he was made OBE.

Associated with the Midland Amalgamated Coal Mines Scheme for some years as an expert in arbitrations on tonnages allotted to the mines, Mr. Perkin was later appointed arbitrator for various sections of the Midlands coalfields and he also served on the Ministry of Fuel and Power's panel of referees dealing with the acquisition of minerals.

Mr. Perkin obtained his colliery manager's certificate in 1899 and is one of the oldest members of the National Association of Colliery Managers.

Head of research of the wire division, British Ropes, Limited, Doncaster (Yorks), Mr. E. A. SHIPLEY has been elected a Fellow of the Institution of Metallurgists.

Export manager of Quickset Water Sealers, Limited, London, S.E.11, a subsidiary of the Cementation Company, Limited, Mr. WILLIAM D. COXSON is on a market survey tour which will take him from Scandinavia to West Africa.

After 50 years' service with the company, Mr. JACK SHAW, manager of the constructional department of Head Wrightson Teesdale, Limited, manufacturers of chemical plant and equipment, etc., of Thornaby-on-Tees, has retired.

Mr. L. R. P. PUGH, managing director of Guest Keen Iron & Steel Works branch of the G.K.N. Steel Company, Limited, has been co-opted to the South Wales executive committee of the Industrial Association of Wales and Monmouthshire.

Director of British Insulated Callender's Construction Company, Limited, and of Painter Bros., Limited, both members of the BICC group, Mr. G. H. WALTON has retired. He has served with the group and its predecessors for more than 47 years.

Brig. A. LEVESLEY, a director of Edgar Allen & Company, Limited, Sheffield, has accepted the chairmanship of Sheffield Standing Conference of Voluntary Youth Organizations in succession to the former Chief Constable of Sheffield, Mr. G. E. Scott.

Coinciding with his appointment as assistant superintendent of the meter department of Associated Electrical Industries, Limited, Motherwell (Lanarkshire), Mr. W. H. BESWICK has been presented with an award for his 35 years' service with the company.

Mr. SIDNEY ARTHUR POORE, who is in the industrial machines department of the motor and control gear division of Associated Electrical Industries (Rugby), Limited, has received a commission from the National Maritime Museum, Greenwich, to build a model of an 1840 marine boiler to be put on exhibition. Three years ago he was commissioned by the museum to build six model marine boilers of various periods. He has completed four and he hopes to finish the others next year.

Mr. GEORGE WEST, son of Sir Harold West, a former managing director of Newton Chambers & Company, Limited, has given up his post as the company's export manager. A presentation on behalf of the management was made by Mr. P. J. C. Bovill, managing director.

Works manager of Armstrong Stevens & Son, Limited, drop forgers and engineers, of Willenhall (Staffs), Mr. J. DEWIS recently received a presentation from the management to mark his 50 years' service with the company. Mr. Dewis, who is 65, began with the firm in the die shop, taking over as works manager when his father retired from the position.

Deputy at Darfield Main Colliery, near Barnsley (Yorks), Ald. GEORGE SKELLY is to retire next month, because of ill health, after 46 years' service in the mining industry. He was Mayor of Barnsley in 1958-59. He started work as a pony boy in the pit at the age of 14 and, in addition to Warfield Main, has worked at Monk Bretton, Barnsley Main, and Mitchell Main collieries.

NCB Production Manager for Aberdare Area

AREA production manager of the No. 9 (Neath) Area, South Western Divisional Coal Board, since 1958, Mr. Phillip G. Weekes has been appointed Area production manager of No. 4 (Aberdare) Area in succession to Mr. Donald Davies as from today (Friday). Mr. Weekes, who is 40, won a scholarship to the Mines Department of the University College, Cardiff, where he graduated in 1942, and started employment with the Tredegar Iron & Coal Company, Limited.

After service in the Royal Air Force, he joined Wyllie Colliery in the Sirhowy Valley and was appointed manager in 1946. Two years later he became manager at Oakdale. After serving as a member of a delegation to improve productivity at a colliery in Nigeria, he became group manager at Tredegar in 1951, and the following year was seconded to the NCB production department headquarters in London where he investigated methods of modern management in industry.

He returned to the coalfield as group manager at Crumlin, and was later appointed deputy Area production manager of the No. 6 (Monmouthshire) Area before taking up the Neath Area post.

COAL NEEDS OF BLYTH POWER STATION

SPEAKING on the growth of Blyth (Northumberland) power station since construction started 13 years ago, Mr. R. Lott, superintendent, said Blyth "A" station was in full operation and used 5,000 tons of coal a day drawn from 10 collieries in the area. Blyth "B" station was expected to be finished in 1966, and it was estimated that the complete plant would need between 4,000,000 and 5,000,000 tons of coal a year—equal to a train load every 20 minutes.

Mr. Lott, who was speaking at Blyth Rotary Club, said the first unit of Blyth "B" station would be ready next autumn, and there would be facilities for stocking six weeks' supply of coal.

African Notes

RISCO MAY CUT OUTPUT

Falling Home Demand Creates Steel Surplus

UNLESS steel export orders are obtained soon, the Rhodesian Iron & Steel Company, Limited (Risco), may have to curtail activities. Reporting a considerable falling off in local demand for the company's products, Mr. W. E. Geerling, chairman, says that there is likely to be a surplus of steel available for some time. To absorb full capacity, all export possibilities and inquiries for steel products from oversea are being considered, but because of the present low level of world steel export prices the company has so far been unable to quote sufficiently attractive prices.

Federal orders for finished and semi-finished rolled steel products in 1960 totalled some 60,000 tons, a 30 per cent. increase on 1959. In addition a 23,000 tons export order for semi-finished steel products, won from the British Iron and Steel Federation, helped to reduce the cost of commissioning the company's new blooming mill and bringing into full production both open-hearth blast furnaces.

Mr. Geerling reports that neither the sheet mill nor the new Lancashire Steel rod mill is likely to be in full production much before the end of the year. In 1960, the company exported pig-iron to the fullest extent of its surplus blast-furnace capacity.

Iscor Seeks Export Markets

Export markets are also to be sought by the Iron & Steel Corporation of South Africa, Limited (Iscor). Chairman, Dr. F. Meyer, announced recently that the drop in home demand, combined with the fact that production was being maintained at the "highest rate" at the Vanderbijlpark and Pretoria works, had produced a temporary surplus of some steel products. Other products are still subject to quota allocations.

Dr. Meyer repeated previous assurances that Iscor would keep the requirements of South African consumers in mind before orders for the general export market were accepted, but asked local users not to postpone orders until their stocks were depleted or nearly exhausted.

The chairman said that most of the plant introduced at the corporation's two works under the £56,000,000 expansion scheme which was started in 1956 was now in operation.

Between the years 1948 and 1954, output of raw steel in South Africa increased by 138 per cent., an achievement equalled by few other steel producing countries, says an article in Iscor News. For the 12 years from 1948 to 1960, output rose by 248 per cent. From 1934 until the end of the last financial year, Iscor had produced about 20,500,000 ingot tons of steel, while total sales of all products amounted to over £474,000,000. As a single concern, the corporation is today the country's biggest employer.

The price of Iscor steel, says the article, is among the lowest in the world. Early in 1961, its prices compared with those of other countries (calculated at ruling exchange rates for an average representative group of products used by the industries of the various countries) were:—Iscor steel, £29 17s. per ton; Australia, £33 12s. per ton; United Kingdom £35 8s. per ton; France, £36 3s. per ton; Germany, £42 6s. per ton; Belgium, £43 2s. per ton; USA, £44 7s. per ton.

Plans are being made by a Mombasa firm for the construction of East Africa's first steel rolling mill. The mill will cost £1,500,000 and will be built in about two years. It will have an initial capacity of about 50,000 tons a year, and is intended to meet all the requirements of Kenya for cold rolled sheet steel. The company concerned, Kenya Aluminium Works, Limited, already manufactures a wide range of household goods. Through a newly created company, Mabati, Limited, it intends also to establish a complete galvanizing industry in Kenya with a capacity rising to 50,000 tons of corrugated galvanized iron sheets a year.

The Transvaal Vanadium Company, Limited, has embarked on a plant expansion programme which will make it the world's largest single producer of vanadium. Following a survey of the European market, the Anglo American Corporation, Limited, has decided to double the size of Transvaal Vanadium's plant near Witbank. Anglo-America took over the company from Minerals Engineering, of Colorado, USA, last year. The magnetite ore from which the vanadium is extracted is mined in open-cast workings near Steelpoort, in the Lydenburg district.

South African record for coal production mined underground at a single colliery (and British and European records on a comparable basis) were broken by Cornelia Colliery's production for 1960, which amounted to 4,089,432 tons. Few British collieries, by comparison, produce as much as 1,000,000 tons in a year from underground working. Chief consumers of Cornelia's large output are the Vereeniging and Vaal power stations, which supply electric power to a number of gold mines as well as other users. Coal from the colliery is also supplied to industrial and domestic consumers.

Four-year investigation into the coal potential of an area around Mamabule railway station in Bechuanaland has shown the existence of a big deposit consisting of two principal seams of medium grade, non-coking bituminous steam coal at a shallow depth. Total reserves in a lower seam with a thickness of 8 ft. are estimated at 163,000,000 tons in an area of about 17 sq. miles, according to the annual report of the territorial Geological Survey. An upper seam, of generally poor and more variable quality, is calculated to contain 245,000,000 tons in an area of about 13 sq. miles. Coal from both seams has a high moisture content of 5 to 7 per cent.

Orders Placed

AEI Equipment for Tube Weld Mill

ELECTRICAL equipment valued at £45,000 has been ordered from the motor and control gear division of Associated Electrical Industries, Limited, by Stewarts and Lloyds, Limited, Corby. The equipment is required for the modernization of a continuous weld mill to increase output of 1½ in. steel tubing to 750 f.p.m., or 4 in. tubing to 320 f.p.m.

The work will involve the replacement of the present mill saw with a special American type of flying saw which, in turn, calls for more powerful electrical equipment having wide and easily controlled speed variation, together with an electronic device for matching saw performance with that of a selected mill stand. AEI development engineers have also been given the task of investigating the problem of measuring tube length and applying correction signals to increase accuracy and thereby reduce wastage.

AITON & COMPANY, LIMITED, ironfounders and pipework specialists, of Derby, has received orders totalling £300,000 from Malaya and Cairo for pipework equipment for new power plants.

CONTRACT VALUED at £300,000 has been awarded to Taylor Woodrow Construction, Limited, Southall (Middx), by the English Electric Company, Limited, London, W.C.2, to carry out additional work at the company's Kidsgrove works, Stoke-on-Trent (Staffs).

ALL THE PLASTICS machinery, totalling £12,500, exhibited at the British Trade Fair in Moscow by Burtonwood Engineering Company, Limited, engineers and precision machinists, of Warrington (Lancs), was purchased, and tenders were requested for a further £259,000 worth.

ORDER WORTH $180,000 (over £64,000) for 250,000 lb. of solder was received at the Radio Show last week by Multicore Solders, Limited, Hemel Hempstead (Herts), from British Industries Corporation of Port Washington, New York, an associate of Avnet Electronics, of the US.

MANUFACTURE of 3,760 ft. of Raystrip and 64 radiant heating panels to be installed in the steel foundry of the Crewe locomotive works of the London Midland Region of British Railways is to be carried out by Copperad, Limited, manufacturers of heating and ventilating equipment, of Colnbrook (Bucks).

OBTAINED AGAINST competition from West Germany, a first order of 20,000 tons of coke, valued at about £135,000, has been secured by the North-Western Gas Board from the Corporation Venezolana de Guayana, of Caracas, Venezuela. The coke is for metallurgical use in the new £125,000,000 steel plant now nearing completion there. It is hoped to secure a larger and regular contract for supplying the steel plant, which will use about 100,000 tons of coke a year.

EMPLOYEES at the Chippenham (Wilts) works of the Westinghouse Brake & Signal Company, Limited, will not get their Christmas bonus of a fortnight's wages or salary. Mr. N. G. Cadman, director and works manager, said on Monday that the directors regretted having to make this decision, but profit margins were running at a considerably lewer level than a year ago. The firm employs about 6,000, and the bonus is payable to those with one year's continuous service.

£350,000 Precipitator Orders for Simon-Carves

RECENTLY, Simon-Carves, Limited, Stockport (Ches), has received orders valued at about £350,000, for two more electro-precipitation plants for the iron and steel industry. One is for dealing with fume from two 360-ton open hearth furnaces at the south works of the South Durham Steel & Iron Company, Limited, Middlesbrough, with a total gas volume of about 100,000 c.f.m. at 300 deg. C. The high-efficiency precipitators will clean the gases to 0.04 N.c.f.

The other is for five electro-precipitators to remove dust from the discharge end of a sinter strand being installed by Head Wrightson Iron & Steel Works Engineering, Limited, at the Scunthorpe works of Appleby-Frodingham Steel Company, branch of the United Steel Companies, Limited. The guaranteed efficiency is 99.3 per cent. and the total gas volume will be about 335,000 c.f.m. at 212 deg. F.

Simon-Carves' precipitator interests were merged with those of Lodge-Cottrell, Limited, Birmingham, nearly a year ago at a time when both concerns were leading suppliers of precipitators to the iron and steel industry. In less than four years they have built a combined total of 22 open hearth furnace fume precipitators and 29 sinter dust precipitators.

Monsanto's Production "Substantially Increased"

WORLDWIDE reductions in the prices of many products, says Sir Miles Thomas, chairman of Monsanto Chemicals, Limited, has had its inevitable effect on domestic price levels as well, with the result that the modest increase in sales turnover for the half year to June 30, 1961, does not reflect the substantial increase in the tonnage of the company's production. The magnitude of these declines in price has overshadowed significant improvements in manufacturing costs and important economies in all items of expense.

The export percentage has been fully maintained at 35 per cent. of sales turnover. In existing conditions it is more difficult than ever to forecast the immediate future. "Our constant effort continues to be towards an increase in our productivity and a reduction in our costs," members are told.

Richard Thomas & Baldwins to Close Billet Plant

DUE to the falling off in demand for billets, Richard Thomas & Baldwins, Limited, is to close its Dyffryn steelworks at Morriston, Swansea. Notices of a month will be given to workmen at the plant this weekend. A redundancy scheme will be worked out, and some of those dismissed are expected to be offered jobs at the company's new Spencer steelworks. An official of the company said the falling demand for billets was "part of the general picture of recession in the industry."

Simmonds Aerocessories, Limited, Pontypridd, is to lay off 50 workers because of "adverse trading conditions" it was announced on Tuesday.

ISI Special Meeting in the USA and Canada

ATLAS STEELS, LIMITED

THIS AERIAL VIEW SHOWS THE ADMINISTRATION BUILDING IN THE FOREGROUND (THE FIRST ALL-STAINLESS CURTAIN WALL BUILDING IN CANADA) AND PART OF THE PLANT. THE BUILDINGS IN THE BACKGROUND INCLUDE THE STRIP AND TUBE MILL, MELTING DEPARTMENT, SHEET MILL, AND FORGE DEPARTMENT.

Atlas Steels, Limited, Welland, Ontario, one of the works to be visited by members of the Iron and Steel Institute during their forthcoming special meeting, started operations in 1928 for the production of tool and other alloy steels. The small plant of that time employed only about 35 people. The policy of steady expansion, facilitated by good amenities for transport, power and water supplies, and manpower, has continued to the present day, some two thirds of the profits having been put back into the business.

TODAY, Atlas employs a labour force of 2,500 people and the works site at Welland covers 220 acres. Its products include high-speed, drill, stainless, and constructional steels. These are sold as billets, bars, strip, plate wire, tubing, and forgings, as well as in the finished state in the form, for example, of hollow drill bars, tool bits, and machined forgings.

The modern plant at Welland includes two examples of process pioneering. Early in 1954 Atlas began operation of a continuous casting machine based on the Junghans-Rossi principle. In the same year the firm installed a hot- and cold-strip mill on unconventional lines, as it included the first planetary hot mill in North America to be used for slab reduction. These two items are given special emphasis in the following brief notes on plant equipment.

Steelmaking Plant

There are six arc furnaces and three small induction furnaces; the latter are of 100-lb., 350-lb., and 600-lb. capacities and are used principally for small heats for research purposes. The electric arc furnaces are one 6-ton, one 10-ton, two 30-ton, and two 50-ton, the last two being built in 1942 when there were few large arc furnaces in operation (Fig. 1).

Continuous Casting Plant

The continuous casting unit, built in 1954, is of vertical design with a casting platform 31 ft. above ground and a discharging pit 20 ft. deep (Fig. 2). Steel to be cast through this machine is tapped into bottom-pour ladles of 12, 30, 35, or 50-ton capacity. They have 1 in. of insulating brick under 11 in. of standard ladle brick lining and have refractory-lined steel covers.

The preheated ladle is filled with steel from an arc furnace, and is then moved by transfer car to the casting machine. An overhead crane lifts the ladle to the casting floor. As the ladle nozzle is opened, steel flows into a tundish, which acts as a reservoir, immediately above the mould. The liquid metal is at all times protected from oxidation with a propane atmosphere.

The mould, made of pure copper with vertical passages for cooling water, is 20 in. long. Atlas now has moulds for casting 4¼-in. squares, 6¼-in. squares, 5½ by 7½ in., 3¼ by 17½ in., 7 by 15 in.,

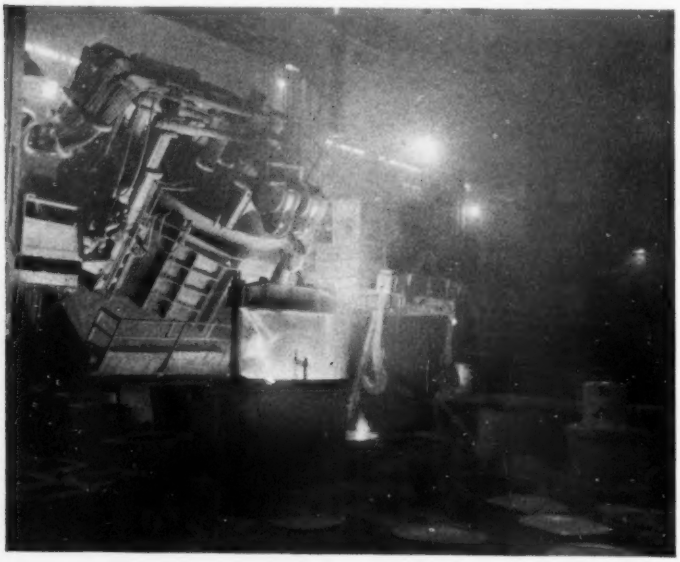


FIG. 1.—A HEAT OF SPECIAL STEEL BEING TAPPED FROM AN ELECTRIC ARC FURNACE IN THE MELTING DEPARTMENT.

and 6⅛ by 24 in. The smaller sizes are cast in double strand.

At the start, a starting or dummy bar is inserted into the bottom of the mould. As molten steel flows from the tundish into the mould, it is chilled, forming a shell ¼ to ½ in. thick. Pinch rolls act to pull down the starting bar, followed by the cast slab or billet. Synchronized machinery oscillates the mould vertically through ¾ in., lowering at the same speed as the billet movement and rising at three times this speed. A vegetable oil is constantly injected to provide lubrication between mould and billet.

As the billet moves lower, it passes through series of small rollers which contain and support all sides. At the same time, water sprays at 20 to 50 lb./sq. in. pressure impinge on the bar, speeding up cooling. Below this cooling chamber are two oxy-acetylene torches mounted so that they clamp on billet or slab and travel downward at the same speed as the billet while cutting is in progress. At the desired intervals, the torches go into action to cut the cast billet into desired lengths, up to 16 ft. The cut lengths are lowered onto a carrier which brings them back to a cooling bed at ground level. From the pickup cradle, the billets or slabs, now about 1,500 F., may be moved to reheating furnaces at the rolling mills.

Casting speed can be set at any desired point up to 175 in./min. The 6⅛- by 24-in. section has been cast at a rate of more than 50 in./min., or 60 ton/hr. Water consumption for mould cooling varies between 100 and 235 g.p.m. In addition, the water sprays may use between 30 and 1,000 g.p.m., depending on the section being cast, the rate of casting and the steel analysis. For each cut made on 6⅛- by 24-in. stainless slabs, 2½ to 3 cu. ft. of acetylene, 60 to 75 cu. ft. of oxygen, and 2½ to 3 lb. of iron powder are used.

Blooming Mill

Most of the steel from the melting shop, whether cast conventionally or continuously into ingot form, is rolled on the blooming mill, which is a 26-in. two-high reversing unit. The housing posts are 15 in. by 22 in. The 26-in. dia. rolls have a body length of 66 in. and run in composition roll-neck bearings. They are designed with grooves of 4¼, 5¼, 5½, 7½, and 11½, and an 18⅜-in. bullhead. The top roll is mechanically balanced by counterweights.

The usual ingot sizes rolled in this mill are 9-in. squares, 845 lb.; 12-in. fluted squares, 1,250 lb.; 16½-in. fluted rounds, 2,530 lb.; 20½-in. fluted rounds, 4,630 lb.; 22-in. fluted rounds, 5,180 lb.; continuous cast slabs 5½ in. by 21½ in., 7 in. by 15 in., and 6½ in. by 24 in. The products are blooms of 13 in. by 11 in., 10 in. by 7 in., 5½ in. by 7 in., 4- to 8-in. squares, and slabs of 2½ to 4 in. thick by 12 to 20 in. wide. The mill output is 300 to 500 ton/8-hr. shift.

Billet Mill

Blooms from the 26-in. mill are rolled in a 22-in. 3-high stand billet mill. The rolls of 66 in. body length are designed with a series of grooves across the entire body. Three sets of housings are available which can be set up for different size schedules while the mill is rolling.

The mill produces squares from 1½ to 5 in., flats 4 to 8 in. wide and 1 to 3 in. thick, sheet bar up to 12 in. wide, rounds 3 in. to 8 in. in dia., hexagons and octagons of corresponding sections, and some special shapes.

Forging

One forging shop has a 1,200-ton press and a 12,000-lb. hammer and the other has six air-operated hammers ranging from 750 to 8,000 lb. in size. The heavy forge shop produces die blocks up to 600 sq. in. cross-section, finished forgings up to 19,000 lb., rounds 6 to 32 in. in dia., and other heavy bar shapes.

The light forge shop performs the finish forging operations on small die blocks, squares, hexagons, octagons, special shapes, rings, and discs. In total, the forging capacity is 12,000 tons.

Bar and Rod Mills

There are two bar mills for production of small sizes. No. 1 mill consists of 15 stands and has

three outlets. From its No. 4 stand bars of 1¾ to 2$\frac{15}{16}$ may be delivered at a speed of about 500 f.p.m. to a 150-ft. hot bed. From No. 5 stand bars of $\frac{5}{8}$-in. to 1$\frac{1}{16}$ in. may proceed at 800 f.p.m. to the hot bed and from No. 7 stand rod of $\frac{1}{4}$ in. to $\frac{11}{16}$ in. may proceed at about 1,200 f.p.m. to either of two pouring reels, giving coils up to 400 lb.

No. 2 mill is a jobbing unit of two 16-in. 3-high stands side-by-side followed by four 10-in. 3-high stands, and one 2-high stand. It has two outlets. Bars, 1½ in. to 6 in., are removed from the last 16-in. stand at about 365 f.p.m., taken over a chain transfer bed and put back through a shear and into cradles. Bars of $\frac{3}{8}$ in. to 2¼ in. may be delivered from No. 5 stand at 300 to 600 f.p.m. and proceed over a 75-ft. hot bed. This mill usually receives billets 2½ to 5 in. square and reduces them to similar bar sections as made on the No. 1 mill.

Cold Drawing

There is a 50,000-lb. draw bench for drawing bars to diameters of 3½ in. to ½ in. Wire drawing to a size range of 0.64 in. to 0.04 in. is done on 16 single-spindle, individually driven wire-drawing blocks and one continuous four-spindle machine.

Reduction may vary from 5 to 35 per cent. in one pass. If more than one pass is required an intermediate anneal is usually given.

Strip Mill

This strip mill installation, made in 1954 to expand the firm's position in stainless steel, does not follow conventional lines as it includes the first planetary hot mill in North America.

Stainless slabs from the blooming mill are placed on a furnace approach table. The furnace is a continuous, high-head unit through which the slabs pass, end-to-end, in a single line. The furnace is 7 ft. 11½ in. wide by 7 ft. 4¼ in. high by about 105 ft. long and is rated at 25 ton/hr. Slabs are carried through the furnace at speeds up to 11.5 f.p.m. on water-cooled, heavy-wall seamless steel rollers 7 in. in dia.

So as to minimize heat loss from the slab, the planetary mill stand is placed only about 11 ft. from the furnace exit. The planetary hot mill and its method of rolling strip are radical departures from usual practice. The mill consists of two large rolls 27 in. in dia. by 24 in. face, each surrounded by 24 work rolls, 3$\frac{5}{8}$ in. in dia. by 24¼ in. face, equally spaced around the circumference of the large rolls. The large rolls are driven in the direction of strip travel at 297.5 r.p.m. by a 1,250-h.p., 2,300-volt, 900-r.p.m., 60-cycle synchronous motor. Mounted

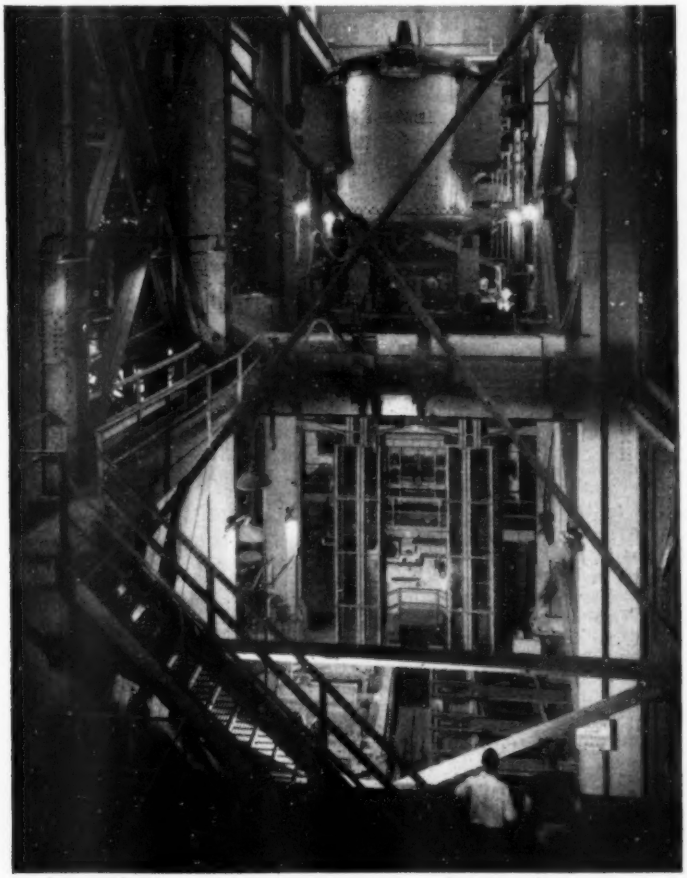


FIG. 2.—THE CONTINUOUS CASTING MACHINE IN ATLAS STEEL'S MELTING DEPARTMENT IS THE FIRST OF ITS KIND ON THE NORTH AMERICAN CONTINENT. IT BY-PASSES THE CONVENTIONAL INGOT MOULD PROCESS IN STEELMAKING AND CASTS STEEL SLABS DIRECTLY FROM MOLTEN METAL.

on the necks of the large rolls are cages in which the small work rolls are mounted. The assembly resembles a roller bearing without the outer race. Springs hold the work roll chocks in place in the cages so that the work rolls are held firmly against the large back-up rolls. The cages revolve in the same directions as the back-up rolls, carrying the work rolls with them. Actual rotation of the work rolls on their own axes, as set up by the back-up roll, is in the opposite direction to that of the back-up roll, and opposite to the direction of strip travel. All four cages are linked together by synchronizing shafts and geared so that, as the cages rotate, top work rolls and bottom work rolls will always be in step, above and below the strip.

When idling, the cage assemblies are driven through a double-acting pneumatic clutch at 146 r.p.m. by the planetary mill drive. At this cage speed, work rolls are driven at 1,130 r.p.m. by the back-up rolls. When a slab enters the planetary mill, the clutch is disengaged and the cages find their proper speed for rolling, which is usually between 131 and 132 r.p.m.

As planetary rolls will not feed themselves, two sets of feed rolls are mounted in the same housing, just ahead of the planetary rolls. Each pair of feed rolls is driven by a 35-h.p. mill-type motor. The feed rolls are 17¾ in. in dia. by 28 in. long, and have a normal surface speed range up to 11.7 f.p.m. Since the planetary mill makes a reduction of as much as 95 per cent. in a single pass, the speed of the steel through the mill may jump from a typical 6 f.p.m. on the entry side to 120 f.p.m. or more on the exit side.

From the planetary stand, strip passes to a 22½ by 30-in. 2-high finishing stand, driven by a 250-h.p., 230-volt, 420/630-r.p.m. d.c. motor. A gear reducer of 17.5 to 1 gives roll speeds of 24/36 r.p.m., or 142/212 f.p.m. The rolls in this stand are adjusted by two 10-h.p. motors. This stand is 9 ft. 6 in. beyond the planetary stand. A looper is located between the two stands to take up slack in the strip and to regulate the finishing stand speed. The strip then passes over the mill runout table to a three-roll uncoiler about 85 ft. away.

The entire hot-strip mill is only about 310 ft. overall length, including the charging table, furnace, mill, runout, and coiler cradle.

The planetary mill receives slabs ranging 12 to 20½ in. wide, 1¾ to 2½ in. thick, and 8 to 40 ft. long. These are normally reduced to strip about 0.125 in. thick. Some slabs are reduced only to about 1 in. thickness, then cut up into sheet bar for further rolling in the hot-sheet mill. The planetary mill has rolled as much as 190 tons in an 8-hr. turn. It has a nominal capacity of 24,000 ton/year.

Strip Annealing and Pickling

Two annealing and pickling lines are located in the end of the hot-mill building; they differ somewhat in main detail, as shown in Table 1.

Cold-rolled strip is produced in two reversing Sendzimir mills. In these units, work rolls 1⅜ in. dia. are backed by pairs of intermediate rolls 2⅛ in. in dia., each of which is in turn backed by a pair of 5-in. dia. rolls. The 5-in. rolls are again backed by larger segmented rolls—actually rows of 8 in. outside dia. bearings on common shafts. The intermediate rolls are driven, while the outer segmented rolls provide the rolling pressure.

TABLE 1.

	No. 4.	No. 1.	No. 2.
Overall length, ft.		500	390
Speed, f.p.m.		4 to 50	8 to 60
Capacity, ton/day		150	60
Furnace length, ft.		56	46
No. of acid tanks		3	2

From the uncoiling reel, the strip passes through a roller leveller, through the mill, and onto the exit tension reel, where the front end of the coil is gripped. The work rolls are brought together and the strip is reduced and recoiled. It is rolled backward and forward under controlled tension. The draft and number of passes depend on the final gauge desired and on the grade of material being rolled.

No. 1 mill rated at 1,800 ton/month, handles strip 0.01 to 0.187 in. thick up to 18½ in. wide. It is driven by a 300-h.p., 600/1,000 r.p.m., 250-volt, d.c. motor.

No. 2 mill is rated at 600 ton/month and handles strip 0.002 to 0.08 in. thick in widths up to 18½ in. This mill is driven by a 350-h.p., 300/600-r.p.m., 250-volt, d.c. motor. X-ray gauges give the operator strip thickness measurements accurate to 0.0001 in.

Strip can be reduced in a number of passes by as much as 90 per cent. Each pass, however, hardens the steel. Hence, in rolling to thin gauges, it is generally necessary to return coils to the annealing-pickling lines for intermediate annealing. Product is usually given a final anneal after cold rolling, and a temper or skin pass is normally then required to flatten the strip and bring it to the desired stiffness. The finished coils may be put through a side-trimming and slitting unit, where they can be cut to desired widths. If the material is desired in cut lengths rather than in coiled form, coils are taken to a levelling-shearing line, which can make up to 18 cuts/min. on stainless strip 0.01 to 0.15 in. thick up to 20 in. wide, cutting lengths of 2 to 10 ft.

Tube Mill

A cold-formed electric weld tube mill processes cold-rolled strip slit to close tolerances to tubes ranging from ¼ in. to 2 in. dia. The mill consists of six horizontal forming stands, four vertical forming stands, and a set of vertical welding rolls. These stands form the strip until its edges meet and the seam is closed. An automatic electric arc welding machine joins the edges under a blanket of helium.

The welded tube passes through a water spray, then into three horizontal and two vertical sizing stands, which true the tube form. A flying saw cuts the tube automatically to required lengths.

Tubes ½ in. and smaller are immersed in water and tested at 250 lb./sq. in. for leakage. They are then degreased and given a bright anneal in an atmosphere of cracked ammonia. This is followed

by cold drawing over a mandrel, increasing length and reducing diameter and wall thickness. The tubes are finally straightened, cut to finished lengths, and given a final test and inspection. Larger tubes are produced by a similar process except that they undergo conventional annealing followed by pickling.

Sheet Mill

The Atlas stainless steel sheet and plate mill was installed in 1950. It consists of four 2-high hot mill stands, a 32-in. by 60-in. balanced mill, a 29-by 62-in. jump mill, a 29-in. by 62-in. finishing mill, and a 29-in. by 48-in. finishing mill. Cold reduction is done on a 60-in. Sendzimir cold mill capable of making a 20 per cent. reduction on 16-gauge sheet in five passes.

Sheet and plate are produced in a number of stainless grades, as well as tool steels titanium and zirconium alloys.

Quality Control

The chemical, metallurgical, and inspection departments implement a thorough quality control scheme at each stage of production, adequate testing and analytical equipment being in special departmental laboratories as well as in the central laboratory where the major part of the metallurgical testing is done. There is, for example, a direct-reading spectrometer capable of analysing for up to 12 elements per sample in 1½ min.

Future Expansion

Continuing its progressive policy, the firm now has on order a vacuum degassing plant which will be the first in Canada and is planning to install bright-annealing equipment for stainless strip and to extend production by the continuous casting plant.

Acknowledgments

Acknowledgment is made to Atlas Steels, Limited, for providing information and illustrations and to the editor of the Iron and Steel Engineer.

Geophysical Studies of Arctic Mining Area in Sweden

GEOPHYSICAL engineers of the ABEM Company, Stockholm, using magnetometers and gravimeters, have recently started on a programme of geophysical exploration to the south and east of the urban centre of Kiruna, in the Arctic Circle. This is to be the first stage of a survey which will eventually cover the whole of the Kiruna iron field.

Prospecting of the Kiruna district has been carried out regularly for some years past, but now it is hoped that the use of newer techniques and instruments will reveal more details about the ore occurrences lying at greater depths.

The railway line between the Swedish iron-ore fields at Kiruna and the Norwegian port at Narvik, on the Atlantic, is at present being rebuilt and reinforced so as to increase its carrying capacity. When the work is completed, the line will permit of traffic with trains with an axle load of 25 tons, as compared with 18 tons at the present time.

Henry Brutcher Translations

NEW translations in the field of ferrous metallurgy issued in July by Henry Brutcher are listed below. A complete list (including non-ferrous papers) and individual papers may be obtained from Henry Brutcher, Technical Translations, P.O. Box 157, Altadena, Calif.

5194: "Pelletizing Iron-ore Fines Preparatory to Strand Sintering." S. ZIELINSKI, A. MASLANKA, and M. KOWALEWSKI. Hutnik (Poland), Vol. 28, 1961, No. 2, pp. 44-49; 5 figs., 3,300 words. $9.75.

5105: "Rate of Flow of Granular Materials from an Opening and the Shape of the High-permeability Zone [Above it in the Blast Furnace]. Experimental Part." B. S. FIALKOV and V. K. GRUZINOV. Izvest. VUZ- Chern. Met., Dec., 1960; No. 2, 17-22; 2 figs., 3,100 words. $7.90.

5177: "New [Polish] Equipment for Vacuum Degassing of Steel." I. MYDLARZ. Problemy Projektowe, 1960, No. 2, 53-59; 500-word abstract translation with 4 figs. $2.50.

5088: "Reactions in Rotary Steelmaking Vessels with Oxygen Top Blowing. Part I." P. E. HARDT, G. VOCKE, and H. SCHENCK. Stahl und Eisen, Vol. 81, 1961, No. 3, 155-163; 17 figs., 6,200 words. $15.75.

5089: "On the Metallurgy of the 'Phoenix Lancing' Process." E. SCHÜRMANN, K.-K. ASCHENDORFF, H. HÖFGES, and E. KÖHLER. Stahl und Eisen, Vol. 81, 1961, No. 3, 163-172; 10 figs., 7,500 words. $18.75.

4926: "Continuous Blowing of Hot Metal in Runner with Oxygen." V. A. FUKLEV. Izvest. VUZ-Chern. Met., July, 1960, No. 7, 60-67; 2,700 words. $6.85.

5110: "Production of Lime-containing Sinter and its Smelting, with Special Reference to Sulphur Removal from Sinter and Pig-iron." B. WEILANDT and F. KRUSE. Stahl und Eisen, Vol. 81, 1961, No. 5, pp. 295-302; 10 figs., 7,200 words. $19.80.

5134: "Kinetics of Direct Oxidation of Impurities in Liquid Iron." S. I. FILIPPOV and S. Z. MARTYNOV. Izvest. VUZ- Chern. Met., Jan., 1961, No. 1, 5-11; 5 figs., 2,700 words. $7.25.

5108: "Mechanism of Longitudinal Cracking on Surface of Continuous-cast Billets." Part 3 of "Study of Continuous Casting of Steel." Y. AKETA and K. USHIJIMA. Tetsu to Hagané, Vol. 46, 1960, No. 12, pp. 1733-40; 9 figs., 4,300 words. $12.90.

5154: "Effect of Deoxidation with a Mn-Si-Al Alloy on Quantity and Composition of Oxide Inclusions in Steel." YU. T. FORYST, V. A. MCHEDLISHVILI, and A. M. SAMARIN. Trudy Inst. Met. im A. A. Baikova, Edit. I. P. Bardin, Vol V, 1960, pp. 22-35; 7 figs., 5,100 words. $14.80.

Mining Students at Birmingham

The reference in last week's IRON AND COAL ("Fewer Mining Students at Birmingham," p. 424) to the number of mining students at Birmingham University was misleading. The statement that there was only one student in the second year and one in the first referred to coal-mining students; the intake of metalliferous mining students was about normal.

CONTINENTAL ROADWAY SUPPORT AT ABERNANT

SUPPORT of tunnels in ground subject to very heavy pressure generally requires the use of a circular lining of reinforced concrete or precast concrete blocks. Various simple concrete-block lining systems have been widely used on the Continent for many years, but in this country reinforced concrete has almost invariably been used. Until recently the only block-lining system employed to any extent has been that developed by Herculare, Limited.

For some time it has been clear that a strong lining, based on the simple, single-taper blocks used on the Continent, and fabricated and installed by NCB personnel or by contracting firms employed on tunnel work, would be advantageous. Such a system, developed at Abernant Colliery, in the South-Western Division of the National Coal Board, forms the subject of Information Bulletin 61/225, issued by the production and reconstruction department of the NCB.

Casting and Installation

Details of block casting and installation are given, together with the relative costs. The aggregate/sand/cement mix used is 3:1½:1 by volume, using 1½ to $\frac{3}{16}$-in. limestone chips. Cube tests are regularly carried out at the Area laboratory at Swansea to ensure a crushing strength of 6,000 lb./sq. in. The blocks are cast under cover on a concrete floor in batches of 30, the mould being arranged to facilitate easy erection and dismantling. The concrete is vibrated in each section of the mould by a compressed-air poker, but the bulletin suggests that the use of a vibrating table would be an improvement on this method.

The mould is not dismantled until at least 24 hr. after casting; in adverse climatic conditions it may be left for 72 hr., allowing the blocks to harden further and so prevent damage to the edges and corners. Blocks are left for a minimum of three days before being transported, this period being extended to seven days whenever the supply position permits.

First the roadways are ripped to a size slightly larger than that required for the block lining, and temporary splay-legged arch supports are installed. Excavation for the inverted section of the roadway is then carried out behind the ripping. This is followed by insertion of the concrete blocks and at the same time, removal of the temporary arch supports. Finally, the inverted section is filled in with debris over the block lining. A similar sequence can be followed when block lining is installed in new roadways driven in the solid.

The price per yard of repairs with block lining varies widely, depending to a large extent on the amount of excavation required. In the extreme case of lining a new roadway driven in the solid, the total cost for heading and support for 18-ft. and 15-ft. dia. roadways would be £445 and £360 per yd., respectively. These costs compare favourably with the costs for roadways of similar size lined with reinforced concrete.

Some of the block lining has now been installed for 10 to 12 months, and although during the first seven days, there was some settlement, leaving a space of 3 in. from the roof, there has been no subsequent movement.

National Coal Board Specifications

SPECIFICATIONS recently issued by the National Coal Board include those mentioned below. Specifications may be obtained from the board at Hobart House, Grosvenor Place, London, S.W.1, the charge for each one being 6d. unless otherwise stated.

No. 255/1961 covers shunting poles (hickory).

No. 256/1961 applies to:—(*a*) External micrometers, having a frame holding a micrometer spindle and nut on one side opposite a fixed anvil on the other, with individual measuring ranges of: (1) 0 to ½ in.; (2) 1 in., *e.g.*, 0 to 1 in., 1 to 2 in., etc., up to 23 and 24 in.; (3) 0 to 13 mm.; (4) 25 mm., *e.g.*, 0 to 25 mm., 25 to 50 mm., etc., up to 575 to 600 mm.; (*b*) External micrometers, having a frame holding a micrometer spindle and nut on one side opposite an anvil on the other, and providing for two or more alternative ranges of measurement effected by means of interchangeable or sliding anvils, with individual measuring ranges of: (1) 0 to 2 in., 0 to 4 in., 4 to 8 in., 8 to 12 in., 12 to 16 in., 16 to 20 in., 20 to 24 in.; and (2) 0 to 50 mm., 0 to 100 mm., 100 to 200 mm., 200 to 300 mm., 300 to 400 mm., 400 to 500 mm., 500 to 600 mm.

No. 257/1961 applies to internal micrometers comprising a measuring head, extension rods, with or without spacing collars, and, in the smaller sizes, a handle. Provision is made for three sizes of measuring heads, in both inch and metric units.

No. 263/1961 relates to general-purpose jointing manufactured from compressed asbestos fibre, and supplied in sheets or rings of a thickness not greater than ⅛ in.

No. 264/1961 relates to the composition, quality, and finish, density, thickness, and tensile strength of oil-resisting compressed asbestos fibre jointing.

No. 265/1961 (1s.) relates to jointing materials and compounds for use in connection with screwed, flat-faced flanged and flat-seated joints for cold water up to a test gauge pressure of 300 lb./sq. in., hot water up to a static gauge pressure of 50 lb./sq. in. and a working temperature of 100 deg. C., town gas up to a working pressure of 50 lb./sq. in., and saturated steam at working gauge pressures up to 30 lb./sq. in.

No. 266/1961 (9d.) relates to the type differences and certain dimensional aspects of taper-ground and flat-ground hand saws for cutting timber.

No. 268/1961 relates to spear-head double-ended spanners having open-ended jaws suitable for hexagons in the BA range as given in BS 57.

ACCIDENTS IN SCOTTISH COAL MINES

Disappointing Trends in 1960

ALTHOUGH there was a substantial reduction in the number of persons killed in Scottish mines in 1960, compared with 1959 and with the average for the years 1957-59 inclusive, Mr. H. Hyde, HM Divisional Inspector of Mines, in his report under the Mines and Quarries Act, 1954 (Stationery Office, 3s. 6d.), states that it was a disappointing year when it is recalled that during 1957 to 1959 disasters occurred at Auchengeich, Lindsay, and Kames Nos. 1 and 2 collieries.

The distribution of persons fatally or seriously injured in the three districts in the division and the comparison with 1959 are shown in Table 1. Table 2 gives the numbers of persons killed or seriously injured both underground and at the surface at mines throughout the division.

TABLE 1.—*Persons Fatally or Seriously Injured in the Districts of the Scottish Division in* 1960 *Compared with* 1959.

District.	Killed.		Seriously injured.		Killed and seriously injured.	
	1960.	1959.	1960.	1959.	1960.	1959.
South-East Scotland ..	19	12	88	73	107	85
West Scotland	18	60	89	68	107	128
North-East Scotland ..	13	23	71	94	84	117
Total..	50	95	248	235	298	330

TABLE 2.—*Persons Killed or Seriously Injured in Coal Mines in the Scottish Division During* 1960, *Compared with the Average for* 1957-59.

Classification of accident.	Killed.		Seriously injured.	
	1960.	Average, 1957-59.	1960.	Average, 1957-59.
UNDERGROUND				
Falls of ground				
(*a*) Face	6	10.0	79	55.6
(*b*) Roadheads	5	8.0	28	27.4
(*c*) Other falls	5	1.7	6	7.3
Total falls	16	19.7	113	90.3
Haulage and transport	13	9.0	57	60.7
Other causes	16	34.3	56	52.0
Total underground	45	63.0	226	203.0
,, surface	5	4.3	22	23.0
Surface and underground ..	50	67.3	248	226.0

At the end of last year there were in the Scottish Division 170 mines owned by the National Coal Board and 67 worked under licence from the board. Thus there were 14 fewer mines worked by the NCB and there was also a reduction of 11 mines worked under licence. There was a reduction in the output of saleable coal from 18,882,000 tons in 1959 to 17,950,000 tons last year. The number of persons employed in the coal-mining industry was about 70,500, showing a reduction of some 7,000 persons compared with 1959.

Accidents from Falls of Ground

Accidents from falls of ground accounted for 43.3 per cent. of all persons killed or seriously injured. Four persons were killed and 40 seriously injured by falls of roof at the working face, compared with nine and 28, respectively, in 1959, in which year the casualties were unduly high. The increase of 12 in the number of persons injured is therefore most disturbing, states the Inspector.

Falls at the Working Face

The most serious accident occurred when a large fall of roof, 120 ft. long, came away without warning during coal ploughing operations on a 157-yd. long face at a gradient of 1 in 2.4 in a 6-ft. seam and caught an overman and three faceworkers. Two of the faceworkers were released uninjured after having been trapped for periods of 4 hr. and 8 hr., respectively, but the other two men were dead when recovered, evidently having been killed at the time of the fall. The face was passing through a zone of troubled strata in which the seam had thickened and the normal blaes roof had been replaced in the vicinity of the fall by overlying sandstone. In addition, the gradient of the seam was changing and the face had been advanced slowly following reopening after a previous fall. In view of these conditions additional support had rightly been provided, but, due to the increased height of the working, the stability of the supports was suspect.

A filler on a machine-cut longwall face in a 2-ft. 8-in. thick seam was setting a temporary prop in his breaking-in place when a fall of sandstone roof came away from between two parallel faults in the roof and killed him. The roof had already been adversely affected by previous workings and it was even more necessary than usual that temporary support should have been set as early as possible. The other fatality also took place

under abnormal natural conditions due to the presence of faults, and the adequacy of the supports set was doubtful.

Proper regard to support can never be neglected with impunity for long, even under normal conditions, but when the roof strata has deteriorated this period of time is generally very short, often disastrously so. While additional support is often, although not always, provided, insufficient thought is given to the method of doing so or not enough care is taken in the setting. Much depends upon the person who is erecting the support, but a great deal also devolves upon the junior officials on the spot who should advise and instruct as necessary and supervise closely in general. Systematic support of a proper standard not only gives immediate protection to workers, but it also reduces deterioration of the roof.

Thirty-four persons were seriously injured by falls of face or side, compared with one killed and 33 seriously injured in 1959. The need for working on the buttock and the dangers of working in front of the coal face were brought out by the accidents. Spragging of undercut coal did not always receive the attention which it so definitely needed.

Five persons were killed and 28 seriously injured by falls at roadheads, compared with seven and 24, respectively, in 1959 and averages of 8.0 and 27.4, respectively, for the years 1957-59. The number of accidents, the report states, continues to be most disappointingly and unsatisfactorily high. Four of the five fatalities involved persons whose work was very closely connected with the setting of supports for their own safety and that of others in the roadhead area, in which it is well known that risk of injury is abnormally high. No matter how good the Support Rules are on paper, they cannot be of effective use unless carried out properly. This is especially so in the roadhead area for several reasons, not least of which are that generally the strata become adversely affected by shotfiring in connection with ripping operations and that during the work cycle many persons work in that region or pass through it. The Inspector deplores having to record accidents, typical of so many others, which show lack of appreciation of risk and failure to make proper use of support in a dangerous area.

Two persons were killed and five seriously injured by falls of roof in wastes. The risks of going under roof from which supports have been withdrawn, not only in wastes but elsewhere, do not seem to be appreciated and it is difficult to understand the general attitude of workmen. Accidents often occur when faceworkers enter hanging wastes evidently because they do not expect them to fall for some time, presumably relying upon the absence of any sound indicating strata movement: yet they must often have seen wastes close unexpectedly without any warning noise during support withdrawal. It is particularly dangerous and, indeed, reckless to enter areas from which support has been withdrawn.

There were seven ignitions, all of inflammable gas, this being one more than in 1959. Five ignitions of firedamp occurred due to sparking in the undercut. Three took place at one colliery on the same face in which conditions were abnormal and as a result caused it to be abandoned. They were extinguished quickly and easily, due to the initiative of the men on the spot and to the fact that an adequate supply of water was readily available. The compressed air/water mixing device to provide a water mist in the undercut, described in the 1958 report, was used when an adjacent replacement face came into production later.

A form of wet cutting which, however, only consisted of water being applied to the ingoing cutter picks and not directly at the point of the jib, was fitted to the coal cutters concerned when four of the ignitions took place. The use of the compressed air/water mixing device is considered to be an incomparably better preventive and, while its use is extending, the Inspector regrets that this is not taking place as quickly as he considers to be necessary. The dangers arising at many mines from an ignition in the undercut are very great indeed and far outweigh any disadvantages found in using an effective device.

As in previous years, wet cutting remained the main method of dust suppression at the working face. Ordinary water infusion was carried out at 1,874 yd. of face and at a further length of 118 yd. in combination with wet cutting, making a total of 1,992 yd.

The total length of longwall face being worked was 57,950 yd., of which 39,069 yd. were being treated; this is a decrease of 6,545 yd. and 4,331 yd., respectively, compared with 1959. There remained 3.4 per cent. of total face length on the filling shift and 2.4 per cent. on the cutting shift which were not within the approved standards, amounting to 1,976 yd. and 1,410 yd., respectively. Suppression measures were applied to the majority of the faces concerned, and the failure to maintain approved conditions was due either to power loading in seams containing dirt bands or to cutting in dirt bands in the seam or in the dirt below the seam. In this connection it is interesting to note that the number of power loaders in use during the year increased to 121 (94 in 1959).

Dust Suppression at New Faces

There were still a few cases of coal cutters working in unapproved conditions at faces where no dust-suppression measures were available. Again, in the main, these were new faces which had been started up before the necessary dust-suppression equipment was available. Dust-suppression equipment should be considered to be just as vital as any other apparatus necessary to start a new face.

The number of pneumatic picks in use again increased during the year from 260 to 284, of which 18 were equipped with water sprays. Of the total number of pneumatic picks 174 were used in coal alone and 110 in stone alone. Most of the coal picks were in thin seams which were water infused to provide approved conditions.

The position in regard to drilling in stone drifts and scourings remained satisfactory in that all percussive and rotary drills used in such places were

equipped with means for dust suppression. At the end of the year, however, some 4.3 per cent. of these places were outwith the approved standards with regard to airborne dust concentrations. Water spraying of the muck pile continued to be carried out in several of the drifts, and in several others water sprays were kept in use during actual shot-firing operations.

Rotary drilling in rippings continued to be satisfactory in general in that fully 98 per cent. of the drilling was done in approved conditions. Likewise, fully 97 per cent. of the percussive drilling in rippings was done in approved conditions. Approved conditions were maintained at all loading points and transfer points on roadways. The length of roadway treated by spraying with water alone was 26,714 yd., and with water plus chemical agents, 2,620 yd., making a total of 29,334 yd.

The number of horses employed in and about collieries was 21 compared with 24 in 1959. They were at six mines in the West Scotland District, all except one belonging to the National Coal Board. Two of them at one mine were used on the surface only. Three mines employed five horses each and one, a licensed mine, had one. Only five of the animals were kept underground, the remaining 16 being accommodated on the surface. The stabling arrangements were satisfactory and the horses were well looked after. Adequate supplies of fodder and bedding were provided and the standard of harness and of shoeing was satisfactory.

SMD Temporary Safety Prop

SOMETIMES it is necessary for a workman to follow a coal cutter on a mechanized face and thereby be under newly exposed roof. To reduce the risk of accident from a fall of roof by providing immediate protection for the period between the passing of the machine and the setting of the permanent support, Safety in Mines Development, Limited, 2, Leslie Road, Gregory Boulevard, Nottingham, has developed a temporary prop which can rapidly be adjusted to seams of varying thickness and can be quickly set and released.

The prop (Fig. 1) is set by depressing the cam handle, when an immediate setting load of 1 ton, yielding at up to 14 tons, is obtained. Both upper and lower members are telescopic, the upper member having fixed location points set 1 in. apart, thus giving an adjustment of 12 in., except for the smallest size, designated No. 0, which has an 8-in. extension. The lower telescopic member has bonded to the surface a block of Don brake lining which contacts the cam and thus eliminates any tendency to slip.

The cam also allows for 1-in. adjustment, which, combined with the 1-in. adjustment in the upper member, caters for variation of seam thickness.

FIG. 1.—SMD TEMPORARY SAFETY PROP TO PROVIDE IMMEDIATE PROTECTION AFTER THE PASSAGE OF A COAL CUTTER OR POWER LOADER ON A MECHANIZED FACE.

A particular application of the SMD temporary safety prop is where an operator has to travel behind a machine on a mechanized face. With the machine travelling at, say, 6 ft./min., an operator with two temporary props can set and withdraw one of these every minute in addition to his normal duties.

During the development of this temporary prop consideration was given to its appearance, so that it should not be confused with a permanent support. Care was also taken to ensure that the prop was light, simple in operation, and easy to set.

The temporary safety prop can be used to give temporary support to conventional faces, stable holes, safeguarding men during drawing-off operations, and spragging overhanging coal. The SMD prop, which has undergone exhaustive trials at the Central Engineering Establishment, Bretby, is approved for use by the National Coal Board in the following sizes:—No. 0, 1 ft. 6 in. to 2 ft. 2 in.; No. 1, 2 ft. 6 in. to 3 ft. 6 in.; No. 2, 3 ft. 6 in. to 4 ft. 6 in.; No. 3, 4 ft. 6 in. to 5 ft. 6 in.; No. 4, 5 ft. 6 in. to 6 ft. 6 in., and No. 5, 6 ft. 6 in. to 7 ft. 6 in.

Specifications for Steel Castings

The British Steel Castings Research Association has now published "British and Foreign Specifications for Steel Castings" (Part 2). This, like the first part, provides a guide to the identification of oversea standard specifications for steel castings and their comparison with British Standards. It analyses the specifications of Australia, Canada, Denmark, India, Japan, New Zealand, South Africa, and the USSR. Among the countries included in Parts 1 and 2, therefore, are all countries of the Commonwealth, of the Common Market, and of the European Free Trade Association (EFTA) that issue national specifications for steel castings. Of countries outside these groupings account has been taken of the US (in Part 1), and, in Part 2, of Japan and the USSR.

PIG-IRON AND STEEL PRODUCTION

IN the following United Kingdom pig-iron and steel statistics, issued jointly by the Iron and Steel Board and the British Iron and Steel Federation, Table 1 gives the production of pig-iron and ferro-alloys and the number of furnaces in blast in June. Table 2 gives the production of steel ingots and castings in June and Table 3 gives details of finished steel in May. Activities of the industry are summarized in Table 4.

TABLE 1.—*Weekly Average Production of Pig-iron and Ferro-alloys in June*, 1961. (*Thousands of Tons.*)

District.	Furnaces in blast.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	20	—	27.1	19.1	—	46.2
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches	8	—	22.4	—	2.3	24.7
Lincolnshire	10	—	45.1	—	—	45.1
North-East Coast	16	2.3	58.9	—	—	61.2
Scotland	7	2.0	20.7	1.1	—	23.8
Staffs, Shrops, Worcs, and Warwicks	5	—	9.1	1.1	—	10.2
South Wales and Monmouthshire	11	3.3	61.5	0.3	—	65.1
Sheffield	2	—	2.9	—	—	2.9
North-West Coast	7	16.8	—	1.4	—	18.2
Total	86	24.4	247.7	23.0	2.3	297.4
May, 1961*	85	23.4	249.6	23.3	3.9	300.2
June, 1960*	84	21.5	244.8	24.3	4.6	295.2

TABLE 3.—*Weekly Average Deliveries of New Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1959.	1960.	1960.	1916.	
			May.	April.	May.*
Non-alloy steel:					
Ingots, blooms, billets, and slabs‡	5.1	5.6	5.7	6.9	7.3
Heavy rails	6.8	8.7	11.1	8.7	8.0
Sleepers	0.6	0.8	1.8	1.2	1.3
Fishplates and soleplates	0.4	0.6	0.9	0.4	0.9
Plates, 3 mm. thick and over:					
(i) Over ⅛ in.	24.8	30.9	31.9	40.1	37.7
(ii) Under ⅛ in.	18.3	22.0	24.1	25.8	24.2
Other heavy prods.	41.2	53.1	53.2	57.7	52.6
Ferro-concrete bars	9.6	12.0	11.6	13.0	15.0
Wire rods	23.5	28.6	30.8	26.3	28.0
Arches, etc.	7.8	7.9	9.3	8.2	8.0
Other light sections	33.0	41.3	44.3	41.9	38.0
Bright steel bars	7.6	9.7	10.7	9.4	9.0
Hot-rolled strip	27.4	33.1	35.8	27.7	28.0
Cold-rolled strip	8.0	10.0	11.1	8.8	9.3
Sheets, incl. coated:					
(i) Hot rolled	11.8	12.9	14.0	11.1	11.1
(ii) Cold reduced	35.2	40.6	42.8	36.9	38.2
Tinplate:					
(i) Hot dipped	7.7	8.0	9.0	5.9	6.4
(ii) Electrolytic	13.2	14.4	15.6	12.9	12.9
Blackplate	0.7	0.9	1.0	0.7	0.6
Tubes up to 16 in.	20.6	23.8	26.7	24.2	21.8
Tube fittings, etc.	0.4	0.4	0.4	0.4	0.4
Tyres, wheels, and axles	2.4	2.4	2.9	1.7	1.9
Forgings(excl. drop)	2.1	2.2	2.5	2.6	2.2
Steel castings	3.6	4.3	4.4	4.3	4.5
Tool steel	0.2	0.2	0.3	0.2	0.2
Total	312.0	374.4	401.9	377.0	367.5
Alloy steel	18.2	22.5	25.2	23.6	22.3
Total deliveries from UK prod.†	330.2	396.9	427.1	400.6	389.8
Add: Imported finished steel	7.1	19.1	25.5	5.8	3.5
Deduct: Intra-industry conversion§	337.3 47.6	416.0 56.4	452.6 62.2	406.4 52.4	393.3 51.7
Total new material	289.7	359.6	390.4	354.0	341.6

† Includes finished steel made from imported ingots and semis.
‡ Other than for conversion into any other form of steel listed.
§ Material for conversion into other products also listed in this table.

TABLE 2.—*Production of Steel Ingots and Castings in June*, 1961. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer and LD.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbys, Leics, Notts, Northants, and Essex	—	3.7	14.8(basic)	2.5	0.1	19.7	1.4	21.1
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches	1.3	33.9	—	5.2	0.4	39.4	1.4	39.4
Yorkshire (excl. N.-E. Coast and Sheffield)								1.4
Lincolnshire	—	51.3	—	—	0.1	51.3	0.1	51.4
North-East Coast	0.9	85.8	—	1.7	0.4	86.6	2.2	88.8
Scotland	1.3	40.7	—	4.1	—	43.8	2.3	46.1
Staffs, Shrops, Worcs, and Warwicks	—	24.6	—	4.6	0.7	28.0	1.9	29.9
South Wales and Monmouthshire	1.4	80.4	19.4(basic)	0.6	0.1	101.4	0.5	101.9
Sheffield (incl. small tonnage in Manchester)	9.2	36.7	—	15.0	0.3	59.1	2.1	61.2
North-West Coast	0.1	—	5.2 (acid)	1.0	—	6.1	0.2	6.3
Total	14.2	357.1	39.4	34.7	2.1	435.4	12.1	447.5
May, 1961*	12.4	379.2	38.2	34.3	2.0	454.6	11.5	466.1
June, 1960*	13.2	381.3	36.5	33.2	2.2	455.1	11.3	466.4

TABLE 4.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal. ††	Basic materials§						Imports.†	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.‡
1959	340	496	477	286	244	210	242	208	7	388	291	2,244
1960	339	505	482	329	319	264	303	243	24	467	361	2,702
1961—Mar.*	339	538	480	351	322	264	313	248	11	471	358	2,779
April	339	538	482	313	322	261	308	244	6	472	355	2,745
May*	339	520	484	333	304	254	300	244	5	466	343	2,754
June	340	520	480	326	298	249	297	233	5	447	347	2,695

* Months contain five weeks, all tables.
† Weekly average of calendar month.
‡ Stocks, ingots, semi-finished and finished steel at the end of the years and months shown.
†† The index for coal is now based on prices ruling on the last day of each month.
§ Used in non-food manufacturing industries.

Stainless Steel Making

CALCIUM CARBIDE INJECTION USED FOR SULPHUR REMOVAL

FOR some years, research workers abroad and in this country have experimented with the injection of various desulphurizing agents into the steelmaking bath and have shown that sulphur can be removed rapidly and economically by such methods in the electric arc furnace.

In Canada, practical desulphurization was achieved by treating steel with magnesium and magnesium-aluminium alloys[1]. In this country, the British Iron and Steel Research Association has investigated the following reagents in powder form:—Calcium carbide; calcium cyanamide; burnt lime; calcium silicide; Raremet compounds; magnesium; aluminium powder; calcium-silico-magnesium, and calcium-silico-manganese. BISRA has reported[2] on the great effectiveness of many of these for desulphurization.

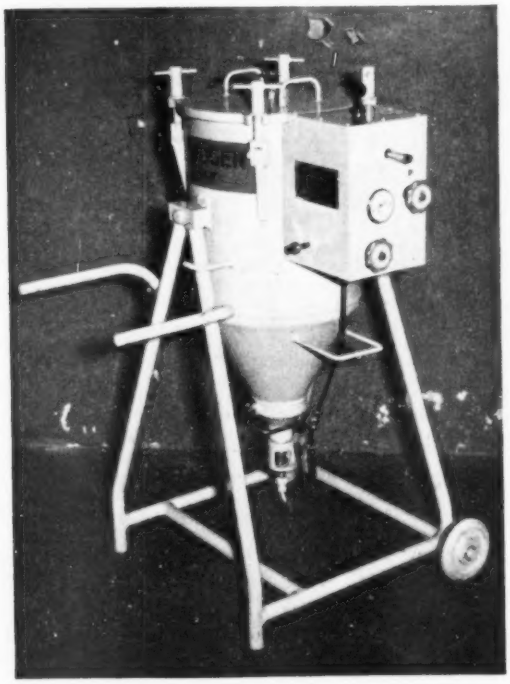


FIG. 1.—METALLURGICAL POWDER DISPENSER DESIGNED AND MANUFACTURED BY THE BRITISH OXYGEN COMPANY, LIMITED.

One might expect, therefore, writes our Metallurgical Editor, that by now many electric steel makers would be equipped to use an injection technique for sulphur removal. But this is far from being the case for two reasons.

Practice Developed in Birmingham

Firstly, as with most new techniques, desulphurization by powder injection is not 100 per cent. technically and economically applicable to every electric shop. Secondly, even in melting shops where the technique appears applicable, it is necessary for the steelmaker to undertake some development work, however small, to establish a practice satisfactory to his particular conditions. Unfortunately, there are many firms that simply will not undertake such development work while there is the slightest doubt about the result.

Nevertheless, desulphurization by powder injection has been taken up quickly by a few alloy steelmakers; notable among these is Spartan Steel & Alloys, Limited, Birmingham, which developed a suitable practice for its stainless steel production just over a year ago.

It is less than four years since this firm, initially a producer of non-ferrous metals only, took up in earnest the production of stainless steels. It now produces about 400 tons per month and plans to expand its steelmaking capacity still further.

At present its output comes from a nominal 3-ton electric arc furnace of 1,500 kVA. electrical input tapping 4½ tons per heat. Its steelmaking is generally a 75 per cent. stainless steel scrap melting process. The scrap, mostly from the local fabricating industry, varies in bulk density and composition, so that a high sulphur at melt-out is not an uncommon occurrence. High sulphur melt-outs can, to some extent, be avoided by using selected scrap, but this means a more restricted and costly scrap supply. In such circumstances carbide injection for sulphur removal offers a big advantage.

At Spartan Steel & Alloys the injection technique is reserved for those charges which melt-out high in sulphur but are scheduled for a low-sulphur specification. There are thus many casts for which the method is not used, *e.g.*, casts of 0.045 per cent. sulphur specification nor, of course, high-sulphur stainless steels of free-cutting qualities.

The steelmaking procedure is as follows. The furnace is basket charged with alloy steel scrap, the power switched on, and the charge melted in

a period ranging from two to four hours. This long range of the melting period is due to the varied nature of the scrap, as many as six chargings having to be made on some occasions. The bath is sampled at melt out and if the sulphur is high, *i.e.*, 0.03 per cent. or more *above* specification, calcium carbide injection is decided upon; otherwise, the conventional refining procedure is followed.

Before injecting calcium carbide the bath is brought to a good heat (1,550 deg. to 1,570 deg. C.) and lime and fluorspar are added to make fluid basic slag. The calcium carbide, usually 50 to 100 lb., is injected in powder form by means of a dispenser designed by the British Oxygen Company, Limited (Fig. 1). A bare steel lance of 1 in. dia. is passed through the door of the furnace and pushed through the slag so that calcium carbide is injected directly into the steel.

The calcium carbide powder is carried into the steel by a stream of nitrogen fed from a cylinder via the dispenser. Vigorous agitation of the bath occurs during the injection period, which lasts 5 to 10 min. according to the quantity of calcium carbide added.

Desulphurization Logs

A sample taken after injection frequently shows a 50 per cent. reduction in the sulphur content, but the amount of sulphur removed is dependent primarily on the initial sulphur, the amount of carbide injected, and the condition of the slag. Further injections of calcium carbide are made as required. The desulphurization logs for two typical heats on which this injection technique was used are given below.

MELT 1282

TIME
2.30 Bath sample S 0.074 per cent.*
2.46 Bath temperature 1,530 deg. C.
2.47 Injection of 96 lb. calcium carbide.
*Addition of limestone (10 shovels) and fluorspar (two shovels).
3.03 Bath temperature 1,530 deg. C.†
3.04 Injection of 96 lb. calcium carbide.
†Addition of fluorspar (one shovel).
3.17 Bath sample S 0.023 per cent.
Sulphur removed 0.05 per cent.; total calcium carbide added, 192 lb.
Sulphur in pit sample, 0.021 per cent.

MELT 1286

TIME
1.40 Bath sample S 0.073 per cent.*
1.59 Bath temperature 1,570 deg. C.
*Addition of limestone (10 shovels).
2.00 Injection of 80 lb. calcium carbide.†
2.05 Bath sample, S 0.053 per cent. slag pulled off.
†Addition of fluorspar (two shovels).
2.45 Injection of 56 lb. calcium carbide.‡
‡Addition of limestone (10 shovels) and fluorspar (two shovels).
2.50 Bath sample, S 0.038 per cent.
Sulphur removed, 0.035 per cent.; total calcium carbide added, 136 lb.
Sulphur in pit sample, 0.030 per cent.

The furnace has a magnesite lining and so far has given very little trouble with sulphur reversion, there being apparently little absorption of slag by the hearth.

Coincident with the removal of sulphur there is a pick-up of carbon from the carbide by the steel which increases the bath carbon according to the amount of carbide injected and the condition of the bath. For average conditions an injection of 100 lb. carbide would give a pick-up of approximately 0.2 per cent. carbon.

The next step is to remove the slag, as otherwise the sulphur would revert from slag to metal during oxidation refining. Having done this the bath is then blown with oxygen to reduce the carbon to as low a content as possible, usually about 0.03 per cent. Finally, a reducing alloy is added to the slag. This is usually ferro-silicon-chrome, the silicon of which reduces the chrome oxide in the slag, while the chrome part alloys with the bath and constitutes the most economic way of adding chrome.

Acknowledgment

Acknowledgment is made to Mr. Z. Stokowiec, technical director of Spartan Steel & Alloys, Limited, and to Mr. T. Bambrick, steel melting plant manager, for permission to publish and for providing the information for this article.

REFERENCES

[1] Canada, Department of Mines and Technical Surveys, Mines Branch Research and Special Projects Reports, Physical Metallurgy Division, July-December, 1956, 1-2, and July-December, 1957, 3-4.
[2] Marples and Pears, "Desulphurization of Basic Electric Steel," J.I.S.I., 1960, June, pp. 195-201.

ABBEY FIVE-ZONE SLAB-HEATING FURNACES

CONVERSION from three- to five-zone firing of the five slab-heating furnaces in Abbey hot mill of the Steel Company of Wales, Limited, has been completed, the last furnace converted having been put into production about the middle of June. The firm now possesses the only five-zone furnaces in Europe.

The converted units can each deal with 130 tons of slabs hourly compared with 100 tons. One important result is more uniform slab temperature for rolling which should make for improved quality and gauge. The furnace conversion scheme started in April, 1960, each furnace being dealt with in turn.

A NEW OXYGEN STEEL PLANT with 70-ton converters and a capacity of 1,000,000 tons per annum is planned by Ilseder Hütte, Peine, Western Germany, to replace the existing basic-Bessemer plant. The Rotor plant will be kept in operation. A new blooming mill and a billet mill are to be built.

TWO WEST GERMAN COMPANIES are reported to be negotiating with the Portuguese Government for the construction of a shipyard at Lisbon in accordance with plans drawn up under the 1959-64 development plan. The original plans called for a yard on the south bank of the Tagus, with a building capacity for ships up to 40,000 tons, and with a dry dock capable of accepting for repairs ships up to 20,000 tons.

Operations and Experiences

AFTER AN IGNITION OF FIREDAMP AT GRANVILLE COLLIERY

On September 1, 1960, an ignition of firedamp occurred at Granville (Lilleshall) Colliery, No. 3 Area of the West Midlands Divisional Coal Board, in a district where methane drainage was being practised. The circumstances of the incident, involving no personal injury, were somewhat unusual in that a comparison could be made between the products of combustion at the seat of a fire caused by the ignition and at the main stoppings in the pit bottom. A paper, of which extracts are given here, was given at the mine rescue superintendents' conference at Wolverhampton on May 9, 10, and 11, in which Mr. J. G. Belfitt, deputy production director (operations), and Mr. W. E. Raybould, chief scientist, of the West Midlands Divisional Coal Board, discussed the mining and scientific aspects of the incident.

GRANVILLE COLLIERY, in the No. 3 (South Staffordshire and Shropshire) Area of the West Midlands Division of the National Coal Board, comprises the amalgamation of Grange and Granville collieries. These shafts, half a mile apart, are situated half-way between Wellington and Newport about one mile to the north of Watling Street. Prior to reorganization starting in 1952, Grange shafts were 8 ft. dia. and 924 ft. deep, while Granville shafts were 10 ft. dia. and 1,200 ft. deep.

The reconstruction plan included using the shafts at Grange as twin upcasts and coupling these shafts by twin airways to the workings on the opposite side of Granville shafts. At Granville the No. 2 shaft was to be deepened 40 yd. and widened to allow a form of horizon mining to be developed, which included the use of 2½-ton mine cars. Potential output was to be 1,800 tons per day. A plan of the underground workings is shown in Fig. 1.

These proposals have been partially completed and, for the time being, the output from the Top Coal workings travels along roadways in the seam until a point is reached where the coal travels down a 1 in 4 drift to feed the mine cars in the locomotive tunnel. These mine cars are hauled by battery locomotives to the pit bottom.

As the workings advanced to the north, methane gas increased in quantity until there was sufficient to apply a methane drainage system to these workings and sell the collected gas to the West Midlands Gas Board. It is the practice to drill 2½-in. dia. boreholes over the goaf and transmit the gas in 10-in. dia. gas mains to the surface.

In the Top Coal, panel 2Ds is a single-unit face 140 yd. long, the right-hand gate being the intake and conveyor gate, the left-hand roadway the return. Coal was undercut and hand-filled onto a 12-in. face chain conveyor. The working height is approximately 4 ft. 9 in. and the face is level except for an 8-ft. 6-in. fault throwing the seam down towards the main gate at a point about 30 yd. from the left-hand gate. The face had advanced about 400 yd. from the main intake at a general average dip of about 1 in 20.

A total air quantity of 9,100 cu. ft./min. was circulating in the district and the normal CH_4 content in the left-hand return was approximately 0.6 per cent. A system of methane drainage had been installed approximately six weeks before the incident and was operating on two boreholes drilled in the return gate and angled over the wastes.

Preparation work was being done at the time of the ignition, eight men were engaged in drawing off and packing, three on conveyor moving, one extending the main-gate belt, and four at the left-hand front rip. A methane drainage team of three men was working further outbye in the left-hand return.

The Ignition

The deputy of the district had found everything in order in his district and was at the left-hand airway front rip at about 8.25 a.m. on September 1, 1960. Preparations had been made for ripping, cables had been disconnected, and coiled up into the gate, the GHH chocks moved forward, a girder removed from under the ripping, and half the ripping was on the floor.

He prepared to fire two holes which had been bored approximately 3 ft. deep, one at either side of the lip. The holes were tested with a break detector and statutory tests for gas were made and none found. A fireclay stemming plug was inserted at the back of each hole after which the holes were charged with 4 oz. of Unigel eq.s.

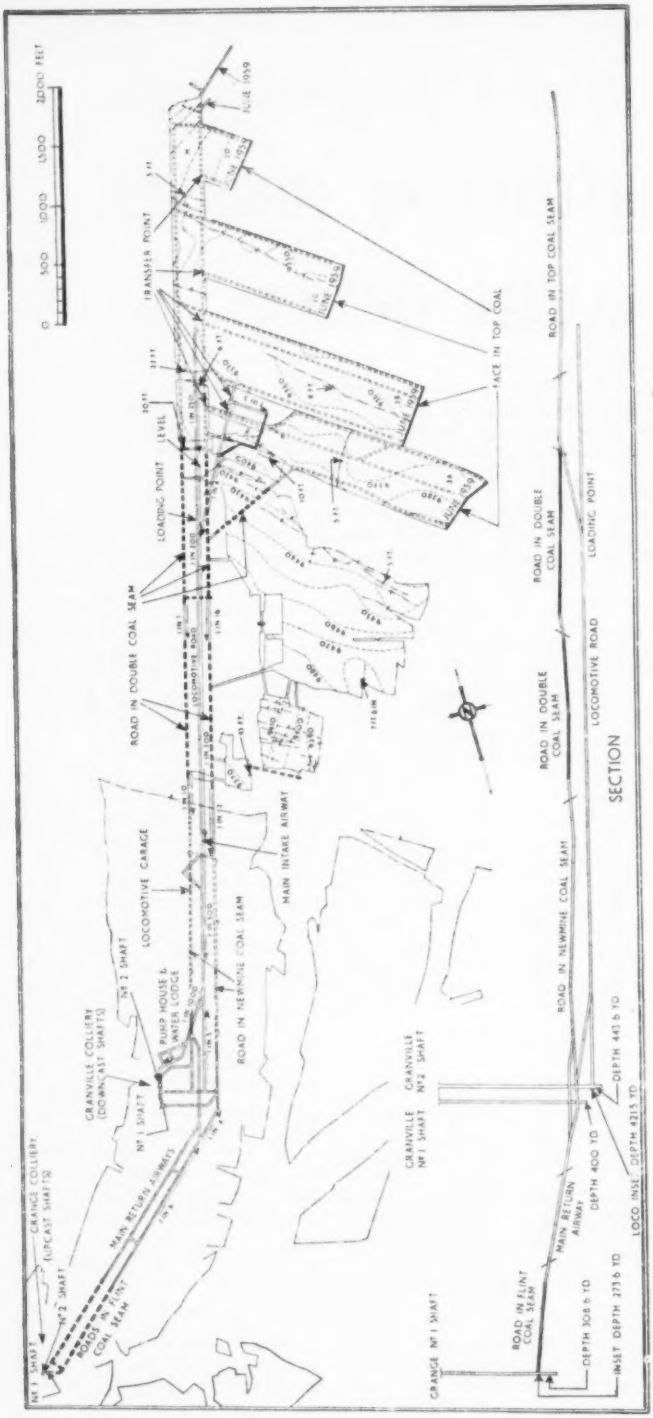


FIG. 1.—PLAN OF UNDERGROUND WORKINGS INDICATING THE VENTILATION SYSTEM.

explosive and stemmed with approximately 20 in. of fireclay stemming. The right-hand shot was coupled up, a gas test again made, workmen and sentries posted, and the shot fired from a position 40 yd. outbye on the left-hand gate from a sheltered firing point.

As the shot went off, the deputy saw a flash at the ripping lip which appeared to travel about 30 yd. towards him and then disappear. He walked back to the lip where he found things looking normal. He then proceeded to make his way along the face and had gone about 3 yd. when there was "another flash and a rumble" which seemed to come from the second or third waste, approximately 30 yd. along the face. He continued to the fault and sent all the face men into the intake gate. Power was cut off from 2Ds and 2Es districts at the main intake, and a message sent to withdraw the men.

Meanwhile, the deputy, together with the overman, had again examined 2Ds face as far as the third waste where they found smoke issuing.

A water jet was directed into the waste. The undermanager had just gone beyond the third waste when there were further "bangs" and the officials on the face decided to withdraw at once. The rescue station was contacted at this point.

By approximately 11 a.m. all men had been withdrawn from the Top Coal Seam. Shortly afterwards instructions were given for the men from the Doubles Seam to be withdrawn and for the pit to be cleared except for the men dealing with the incident on 2Ds face. The emergency scheme was put into operation.

Sealing Off

At approximately 12.30 p.m. it was decided to seal off 2Ds panel. The supply of materials was arranged, air sampling points fixed, and sites for seals chosen on 2Ds intake and return and a start was made in building the stoppings. While rescue teams were being briefed near the separation door on 2Ds return, another bump was heard at approximately 3.45 p.m.

which vibrated the ventilation doors at the outbye end of the district.

As work continued at the two stoppings, a regular check was kept of conditions by air analysis. Indications of deterioration were apparent at about 8 p.m. and a prearranged plan to resite the stoppings further outbye was put into operation. All persons were therefore withdrawn to the region of the pit bottom and sealing commenced on the main intake and on the two main returns at the pit bottom.

During the next day, samples indicated an improved condition inbye, but, nevertheless, work continued at the three stoppings and, by 6.15 a.m. on September 3, these were completed except for the final plug.

In view of the more stable conditions revealed by air analysis, an exploration party travelled the main intake to 2Ds junction during the afternoon of September 3. There was virtually no air flow on 2Ds district and there was a build up of methane in both intake and return.

On the afternoon of September 5, an exploration party again took samples which revealed marked fluctuations in the conditions suggesting that combustion was still taking place. The following day, results of the analysis still indicated fluctuating conditions, and as a result no inbye inspection was made.

An exploration party again visited the district on September 7, and took further samples. These revealed that conditions inbye compared very closely with those of two days previously. The analysis revealed a trend towards an extinctive atmosphere near the face. On September 9, samples were taken further in the district and from these results it was concluded that combustion had ceased. As a result it was decided to complete the local seals on 2Ds district and these were completed by 6 a.m. on the following morning.

Since the district was now sealed at the entrance the ventilation was gradually restored by the removal of the pit-bottom

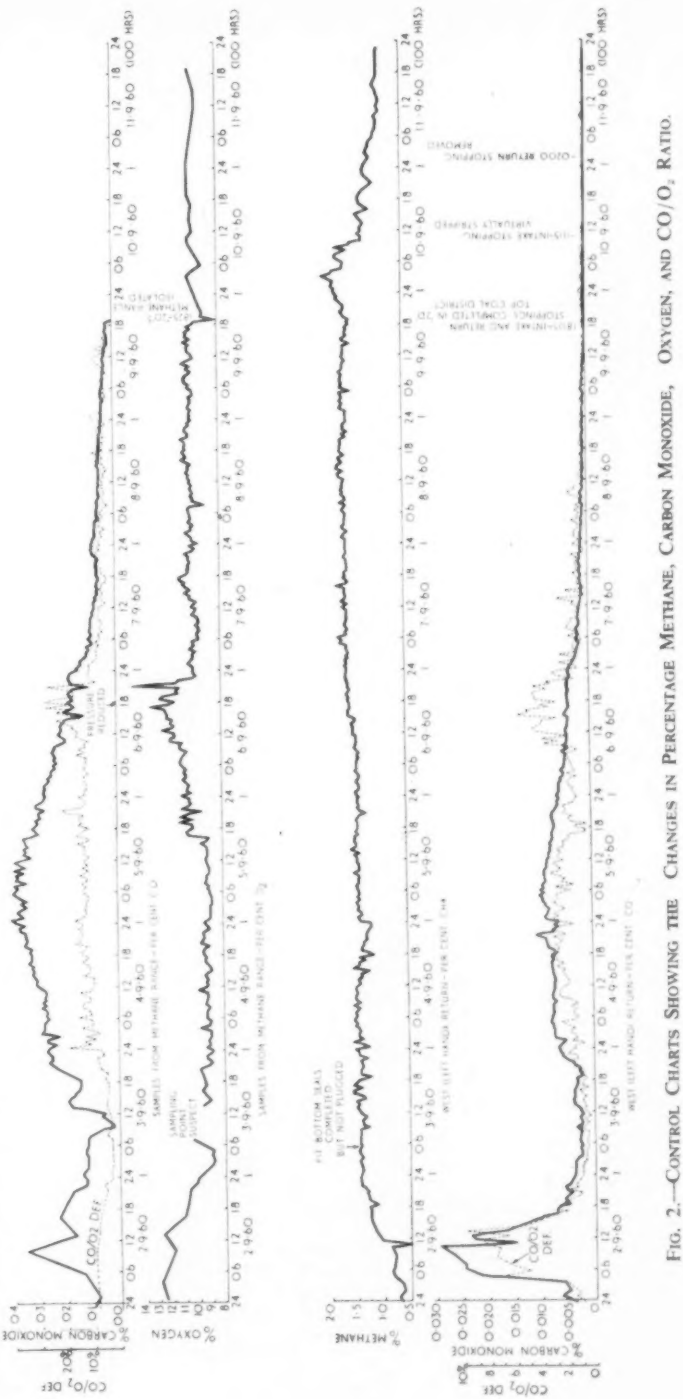


FIG. 2.—CONTROL CHARTS SHOWING THE CHANGES IN PERCENTAGE METHANE, CARBON MONOXIDE, OXYGEN, AND CO/O_2 RATIO.

seals and fully restored on September 11. During that afternoon with the full quantity of air circulating in the other parts of the pit, a joint inspection by the Inspectorate, NUM, and board officials revealed satisfactory conditions elsewhere in the pit and the colliery was declared safe for normal working which started on September 12.

The evidence provided over the whole period by sampling shows that there were a number of ignitions of varying intensity, gradually reducing until conditions became extinctive. Following the first ignition there appears to have been a second, about 24 hr. later, of sufficient violence to dislodge the two doors at the top of 2Ds return, about 470 yd. further outbye. Another marked disturbance occurred about mid-day on September 6, and a series of smaller disturbances appears to have gradually petered out. The extinctive atmosphere was probably primarily due to the dislodged ventilation doors and the resultant short circuit of air and perhaps to some extent to the effect of approximately 1,000,000 gal. of water which was admitted down 2Ds intake road over this period and which is calculated to have sealed off the air circuit on the face.

Scientific Aspects

The Granville incident was unique from the scientific point of view in several ways. Following the ignition, although seals were prepared in the pit bottom, they were not plugged and ventilation was maintained through the workings to prevent the build up of dangerous concentrations of methane in the main roadways. Since the methane drainage range at 2Ds was almost certainly connected with an open break on the face involved in the incident, there was available a sampling pipe from the seat of the incident to the pit top and it was possible to compare samples from the seat of the incident, obtained from the methane drainage range, with those taken from the return in the pit bottom.

The coal at Granville Colliery is not normally liable to spontaneous combustion. It would appear, however, that some coal or carbonaceous material became ignited about 24 hr. after the main methane ignition. The analysis of samples taken in these two distinct phases of the incident, illustrate the difference in build up of carbon monoxide, resulting from an ignition and the slower build up resulting from combustion.

The incident also provided an opportunity to determine the effect of methane drainage on the build up of an extinctive atmosphere in the fire zone. The ability to assess what was happening underground a mile from the pit bottom by air samples taken at the pit top was clearly demonstrated.

Upon receipt of information of the incident a laboratory was established within a few hours, in a room previously earmarked for such a purpose, with staff and equipment from the Baggeridge laboratory. In order to maintain a half-hour sampling frequency in both returns and from the methane drainage range, the North Staffordshire mobile laboratory was brought to the site and manned on a 24-hr. basis by additional staff transferred from the North Staffs and Cannock Areas.

Control charts, shown in Fig. 2, on which the carbon monoxide, methane, and CO/O_2 ratios were plotted, illustrate the course of the incident. It will be seen that at approximately 4 a.m. on September 2, about 20 hr. after the first ignition, there was a rapid rise in the carbon monoxide content of the main return air. This was reflected in the carbon monoxide content of the gas from the methane drainage range. Unfortunately, at this time samples at this point were only taken on a 4-hourly basis and, in consequence, the series of peaks shown in the return air sample was not detected in the methane range. In all, four peaks in the carbon monoxide content, which were reflected in the CO/O_2 deficiency ratio, occurred in a period of about 10 hr. which may represent a series of ignitions. After this the carbon monoxide content and the CO/O_2 deficiency ratio fell steadily to approximately 0.003 per cent. CO and a CO/O_2 ratio of 1 per cent. in the West return.

It will be noted that during the period of the assumed methane ignition the methane content of the main return was below normal. With the construction of the seals at the pit bottom and the consequent reduction in ventilation, methane in the West return increased to 1½ per cent. at which value it remained reasonably constant until the stoppings were removed a week later.

At 8 p.m. on September 3 there was a significant rise in the carbon monoxide content of both the main return and the methane drainage range. This was accompanied by an increase in the CO/O_2 ratio. It will be seen from the chart, however, that the rise was more gradual and differed in intensity from the conditions 36 hr. previously when the gas ignition was presumed. This increase was maintained both in the main return and in the gases from the methane drainage system for approximately three days. During this period water from the firefighting main was allowed to flow into the face with the object of filling the swilly, caused by an 8-ft. fault at the left-hand end of the face. If this swilly could be filled, ventilation round the face would be stopped and eventually the wastes would be flooded and extinguish any combustion which was taking place. It will be seen that the peak of this heating was reached between 9 p.m. on the 4th and 6 a.m. on the 5th, at which time the main return had a CO concentration of 0.010 per cent. CO with a CO/O_2 ratio of 3 per cent. and the methane drainage range a CO content of 0.4 per cent. and a CO/O_2 deficiency of 15 per cent. In view, however, of the low oxygen and high methane content of the gas in the methane drainage range, the carbon monoxide content is more significant than the CO/O_2 ratio.

From the make of carbon monoxide in the main return, it was calculated that these conditions could arise from the combustion of 26 cu. ft./min. of methane or approximately 45 lb. of coal per hour.

It would appear from the analyses that a further incident of some sort occurred at about 10 a.m. on the 6th. This was typified by a sudden rise in the

CO/O_2 deficiency ratio in the main return and the methane drainage range which was unaccompanied by an increase in the carbon monoxide concentration.

There was, however, an increase in the oxygen content of the methane range gases and a small increase in the methane content of the main return. Since there was no increase in the CO concentration, the CO/O_2 ratio could only be caused by a decrease in the oxygen deficiency. Such a decrease could be caused by a heavy fall which cut off the ventilation to part of the pit. Such a fall could result in an increase make of methane which would explain the rise of approximately 0.2 per cent. in the West return. The changes in oxygen content in the methane range at this time indicate that the "fall" was in the vicinity of a methane drainage borehole and is presumed to have been at 2Ds. Alternatively, the extinction of burning methane would have a similar effect.

By September 9, the CO and CO/O_2 ratio in the main return and in the methane drainage range had fallen to a low and steady value and an inspection of the district proved the presence of water for a considerable distance along 2Ds intake and samples in 2Ds return indicated the probability of an inert atmosphere on the face and the cessation of active combustion.

Seals on 2Ds intake and return were completed by 6 a.m. on September 10. At the same time, 2Ds was isolated from the methane drainage range. In view, however, of the fact that there was a high concentration of methane behind the return stopping and that the overcast had been blown down, any leakage of methane from 2Ds stopping, would be included in the intake to 2Es. It was important therefore to reduce leakage through the stoppings to a minimum. Accordingly, they were latex sprayed on September 11, prior to reopening the pit on the following day.

One point of interest was the necessity to decide whether to continue methane drainage during the incident or not. Whereas the emission of methane on 2Ds face would help to build up the inert atmosphere quickly, we were anxious to avoid contamination in the remainder of the pit. An attempt was therefore made to draw sufficient gas through the methane drainage range to keep the pit safe, but allow some release of gas at the face to produce an extinctive atmosphere. This objective seems to have been successfully achieved.

As a check on the CO/O_2 ratio, the CO/CH_4 ratio was also plotted for the West return and the methane drainage range. This ratio is based on the assumption that the make of methane remains constant when a pit is not being worked, and thus the CO/CH_4 ratio is a measure of carbon monoxide production which is independent of ventilation. This graph, while showing the main peak, did not give any indication of the happenings on September 6 since the CO make was not affected.

Conclusions

Samples taken from the methane drainage range, and which, in effect, were drawn from the vicinity of the incident, present virtually the same picture as those obtained from the main return, although of a different order of magnitude (20 times as great). This confirms that samples taken at the pit bottom a mile from the scene of the incident faithfully monitor the situation in-bye.

The comprehensive picture of the situation which was available from the control charts at all times illustrates the importance of having an adequate on-the-spot scientific service at an incident of this nature.

COKE RESEARCH IN 1960

ACCORDING to the annual report of the British Coke Research Association for 1960, 85 per cent. of the research effort is planned in detail and the remaining 15 per cent. is left for *ad hoc* investigations and for the preliminary exploration of new ideas.

The association's facilities at Chesterfield are covered by three broad categories—the test plant, applied studies laboratories, and fundamental studies laboratories. The test plant has been primarily concerned with improvement in the quality and yield of metallurgical coke, and the applied studies laboratories with the thermal behaviour of coal and the fissuring of coke, the resistance of beds of coke to the flow of gasses, methods of analysis and measurement, and the use of oven coke in domestic appliances.

The fundamental studies laboratory has been investigating the primary structure and reactivity of coke and its micro-structure and mechanical properties.

Work on the investigation of liquid effluents and atmospheric pollution has been closely linked with the work carried out at Leeds University.

The *ad hoc* investigations which were carried out during 1960 on behalf of members of the BCRA included laboratory studies, but the main effort was at the test plant where experiments were carried out for the iron and steel industry, the National Coal Board, and the independent coking companies. For the iron and steel industry the emphasis was on problems of charge preparation and some of the results led to quite important changes of practice at one or more of the plants concerned. Studies for the NCB included the effect of drying upon coal charges and an examination of their alkali-activation. For the independent coking companies the work was based mainly on the use of the small test ovens for the investigation of specific blending problems in relation to improved coke quality.

Mine-car Loader

MR. W. L. JACKSON, chief engineer in the National Coal Board's Durham Division, has devised a mine-car loader which reduces the amount of degradation of coal at loading points. Coal from the main conveyor belt is fed into a small receiving hopper on a scraper conveyor designed to deal with peaks and to feed the coal into a specially constructed hopper. The bottom strand of the scraper conveyor is used for the level filling of the hopper.

The hopper portion consists of an inner and an outer hopper, the whole being supported on load cells; the outer hopper is suspended on two hydraulic jacks so that when a predetermined amount of coal has been fed into the hopper they lower the outside container together with the coal into the body of the mine car—prepositioned below—at the same time as the scraper conveyor is stopped. On reaching the level of the downward stroke the doors on the outside hopper are automatically opened and the hopper withdrawn, leaving the coal in the mine car, and the hopper doors closed in the raised position. As soon as this position is reached the scraper conveyor motor is restarted and the cycle repeated. The mine cars are then moved forward on a feeder so that the next car is positioned to receive its load.

The whole cycle of loading a 3-ton mine car can be achieved in 10 to 12 sec. By enclosing the top of the hopper and the scraper conveyor the dust nuisance can be considerably reduced. This system enables mine cars to be loaded with the correct amount of coal, eliminates spillage, and provides opportunity for automation. The main conveyor could run continuously while cars were available for filling. Positioning cars under the hopper can be done by means of track switches. The loading point can be designed to suit individual car sizes: with small tubs two may be loaded simultaneously.

A modified scheme being considered incorporates a chain-belt feeder which moves over the length of the hopper at fixed intervals, the interval being decided by the operation of a coal-level control fixed on the underside of the moving conveyor, the conveyor being arranged so that the hopper is fully loaded when the conveyor reaches the limit of its travel. While the mine car is being loaded the conveyor is returned to its original position, thereby acting as a small bunker conveyor. The movement of the conveyor is controlled by a hydraulic ram.

A REPORT from Portugal states that the Siderurgia Nacional is expected shortly to begin production at the Seixal steel plant.

THE Bank of London & Montreal reports that preliminary negotiations have been concluded between concession owners and a group of foreign investors for the exploitation of rich manganese deposits situated about 40 miles from Buenaventura, Colombia.

Colliery Accidents

FATALITIES caused by accidents at mines under the Mines and Quarries Act, 1954, in the second quarter of this year total 61, compared with 68 in the previous quarter and 110 in the second quarter of 1960. The number of persons seriously injured was 354, compared with 347 in the previous quarter and 381 in the second quarter of last year.

Details are given in the following table:—

	Number of persons killed during the 13 weeks ended:		Number of persons seriously injured during the 13 weeks ended:	
	July 2, 1960.	July 1, 1961.	July 2, 1960.	July 1, 1961.
Underground—				
Explosions of fire-damp or coal dust	45*	—	2	—
Falls of ground ..	28	21	157	146
Haulage	20	17	103	110
Miscellaneous (including shaft accidents) ..	17	15	71	62
Total	110	53	333	318
Surface—				
All causes	11	8	48	36
Total underground and surface	121	61	381	354

* Accounted for entirely by total number of fatalities at Six Bells Colliery.

New Self-contained Breathing Apparatus for Mines

EVERY type of closed-circuit breathing apparatus now used by mine rescue teams has the disadvantage that, after an initial period during which the apparatus warms up, the air provided becomes sufficiently hot and humid to cause the wearer to gain heat through his respiratory tract when he is working moderately hard. This is undesirable in the adverse conditions in which mine rescue teams frequently have to operate, and an improved apparatus, which for convenience has been named SIMBAL (safety in mines breathing appliance: liquid) has been produced by the Safety in Mines Research Establishment.

Its development has shown that the problem of providing cool and reasonably dry inspired air can be solved for appliances using liquid oxygen without incurring excessive penalties in weight or bulk.

SIMBAL, as now made, weighs 33 lb. when fully charged. During moderately hard work the apparatus lasts for about 3 hr. at an ambient temperature of 72 deg. F. or for 2¼ hr. at 104 deg. F. For most of this time SIMBAL provides inspired air that is between 7 and 15 deg. F. below ambient temperature. The apparatus has the additional advantage that it has a low breathing resistance achieved by a new type of relief valve and radial-flow soda-lime purifier.

Metallurgical Progress

Some abstracts from recent reports on research and developments, at home and abroad

Sinter Plant Computer System Tightens Analysis Control. ANON. (Steel, 1961, Vol. 148, No. 12, pp. 104-7.) A closer control of sinter quality, more predictable blast-furnace performance, and possible improvements in iron analysis are some of the benefits that may be provided with the application of high-speed analysis and data-recording techniques. A digital computer logs the sinter-process data, including instantaneous X-ray analysis of raw materials and the final product. At the Youngstown Sheet & Tube Company's plant, present operations are based on the proportioning of raw materials by weight. With the computer system the company hopes to base operations on chemical analyses and weights.

Analyses are made as follow:—A small portion of the material to be analysed is divided from the conveyor. The material must be fine—90 per cent. to pass through a 200-mesh screen when dry. A stream of the material passes the X-ray head at a rate of 5 cu. in./min. The material fluoresces, or emits X-rays when it is struck by strong emissions from the X-ray head. The intensity of the rays for a certain wavelength—representing a particular element—varies with the amount of that element present in the sample stream. The X-ray head includes a sensing channel for each wavelength (or element) to be monitored. Calibration translates the pulse output of each channel directly into the percentage of a particular element present.

Information from the sintering operation is fed into the digital computer for processing. The computer calculates the percentages of fines in the raw materials and the percentage of each material in the mix. Also, it calculates the sintering efficiency and the final yield of the sintering system.

Innovation and Automation for the Iron and Steel Industry. W. E. MILLER. (Blast Furnace and Steel Plant, 1961, Vol. 50, No. 3, pp. 247-51.) The benefits to be obtained from full computer and automatic-gauge control in steel mills are many and significant. These are:—(1) An increase in tonnage output and yield; (*a*) Reduction in cobbles, which are frequently the result of error in setting up the mill, and slow operator reaction time. They usually occur in the first slab after a change in the set-up. (*b*) Faster and more accurate set-up time. The automatic control can set up all stands simultaneously. (*c*) More equitable distribution of load for all mill stands. (*d*) Practically all the strip will be within a commercial tolerance on the front end and the tail end. (*e*) Reduction of off-gauge variation due to temperature and skid-mark effects. The gaugemeter system keeps within the closest tolerance. (*f*) Rolling on the heavy side of tolerance band. (g) Reduction in side-trim losses due to width variation. (2) The saving in operation costs: (*a*) The possibility of operating a mill with a reduced labour force in the central pulpit. (*b*) The use of operators with less experience. (*c*) Eliminating the keeping of manual records. (3) Improvement in the product quality: (*a*) Controlled rolling practice. The mill is set up in a uniform manner so that the same product is rolled in the same way every time. (*b*) More complete production records and speedier availability of these records to the management enables quick correction of problems affecting the product quality and production efficiency.

The hot strip-mill automation programmes can recover the initial cost in periods of one to three years. Each mill must be examined carefully and the automation system must be designed to meet the mill's technical requirements, production schedules, and management-control objectives.

Iron Offers Low Levels of Impurities. ANON. (Steel, 1961, Vol. 148, No. 11, pp. 122-3.) Low levels of impurities are offered in a new ferrous material, called "Sorelmetal." The metal is supplied in two grades. The D −1 grade contains 2.25 per cent. carbon, while the F −1 grade has 4.25 per cent. Both grades contain 0.02 per cent. sulphur, 0.025 per cent. phosphorus, 0.08 per cent. silicon, and 0.009 per cent. manganese.

After tapping from the reduction furnaces, the metal is treated to reduce the sulphur content to the required levels, and the carbon is adjusted, if necessary. Then it is cast as pigs or converted into shot form by water graulation. The low levels of elements other than iron and carbon are unusual and can be helpful by permitting the dilution of objectionable impurities in scrap. The low-silicon content permits the charging of generated scrap without silicon build up. Ferro-silicon magnesium alloy can be used as the source of the magnesium for causing modulization.

The low-manganese content of "Sorelmetal" aids in producing fully ferritic, ductile iron. On account of the low-alloy content, most of the carbon is combined. This lowers the melting point, making additions to a steel bath easier. It has been used for the recarburizing step in the production of high-carbon steels in electric and open-hearth furnaces.

A Reduction Process Made Feasible by the Sale of Both the Iron and Slag. ANON. (Steel, 1961, Vol. 148, No. 11, pp. 123-4.) This reduction process is turning out iron from an ore which would otherwise be useless, and the slag is worth about as much as the metal. Starting with a mixed hematite and ilmenite ore (iron-titanium mineral), most of the iron is recovered as the metal. The slag contains some of the iron and all of the titanium, which is sold to producers of titanium pigments and titanium metal. At the mine, the ore is crushed to under 2 in. Then it is reduced to less than $\frac{3}{8}$ in. at the plant, the fines being separated and processed

to remove the gangue. The combined concentrates are roasted in kilns. After cooling, the concentrates are blended with kiln-dried anthracite, which serves as a reducing agent.

Six electrode-arc furnaces are used and these are lined with basic bricks. The furnaces are operated as open-bath, open-arc units, and the mixed ore and anthracite is charged around the periphery of the bath to reduce the attack of the slag on the furnace refractories. At the bath temperature—about 1,650 deg. C.—the anthracite reacts to reduce the iron. This is not complete and a portion of the iron oxide remains in the slag, reducing its melting point. Halting the reaction at this point holds the titanium in the slag.

The slag is tapped four to six times a day, and is water-sprayed for cooling and then crushed. The titanium content of the slag, calculated as TiO_2 is 70 to 72 per cent. for the pigment grade, and 74 to 75 per cent. for the metal grade.

The iron is tapped two or three times a day. The sulphur content, as tapped, is of the order of 0.11 per cent., so ladle desulphurization with calcium carbide is the standard practice. This drops the sulphur content to about 0.02 per cent.

Application of a Simulator to Guide the Tinplating Line. ANON. (Iron Age, 1961, Vol. 187, No. 11, pp. 114-5.) The electronic tinplating line simulator consists of a circulating cell, a conduction reflow system, and a brilliance comparator. The circulating cell contains a 25-gal. capacity electrolyte reservoir, a centrifugal pump, and a magnetic flow meter. The pump pushes the solution upwards through the magnetic flow meter and on through the plating compartment, which contains a 6¼ by 3-in. strip sample and the tin anode. The conduction-reflow system remelts the deposited tinplate, this being done during the final phases of the process to provide a lustrous finish to the plate surface.

One of two processes can be employed to remelt the tin. In one case, a current is passed through the strip. The power losses, being resistive, heat the strip sufficiently to melt the tinplate. The other method, which is widely used, is induction heating. The brilliance comparator is a reflectometer with a variable-intensity light source. The tinplate-line simulator is compatible to both acid and alkaline-plating methods. To do this, it meets the operating-temperature requirements of either electrolyte. These temperatures are accurately controlled to plus or minus 2 deg. F. The electronic simulator can operate in a wide range of speeds. Also provided are the high-current densities needed in the alkaline process. The system was designed for ease of operation. Interlocking devices safeguard the laboratory technicians. Variables such as speed of electrolyte, plating time, and temperature of electrolyte are visible to the operator for immediate recording.

Fluid Mould Aids Forging Finish. ANON. (Iron Age, 1961, Vol. 187, No. 13, p. 111.) The fluid-mould casting process is characterized primarily by the use of a special slag in the ingot mould. The slag is melted and introduced into the bottom of the mould. As the metal rises in the mould, the floating molten slag coats the mould wall with a thin skin. Pits or cavities in the mould wall are filled with the molten slag, producing a smooth, continuous envelope to contain the molten metal. This slag, supplied in 1-in. pieces, melts within a narrow range near 1,200 deg. C. Its viscosity approaches a minimum at about 1,260 deg. C. A slag density of just over 2.5 permits good separation in the body of the ingot. Stripping refractory-type inclusions from the metal while pouring was first seen on a two-ingot heat of 12 per cent. chromium steel. Microscopic examination proved that high-melting point chromium-base inclusions were stripped from the FMC ingot, while lower-melting inclusions remained untouched.

The FMC technique, when included with good melting practice, gives excellent ingot surfaces, low-refractory inclusion counts, and increased ingot-mould life.

Can Uranium Improve Steel. S. L. GERTSMAN. (Iron Age, 1961, Vol. 187, No. 14, pp. 110-111.) Tests on 500-lb. heats of steel show uranium to be effective as a killing agent. The uranium was added as 1½ by ½ by ¼-in. pieces wrapped in aluminium foil. Recovery was about 25 per cent., but it is expected that when larger volumes are treated, the recoveries will be altered. When a plain-carbon or low-alloy steel is used as an anode in an electrolytic cell, it shows a dark-pitted surface after immersion in the acidic electrolyte. The surface of the uranium-bearing steel sample remains smooth, bright, and lustrous. The lack of pitting has been confirmed for a series of 0.40 per cent. carbon steels, containing up to 0.23 per cent. uranium.

A small amount of uranium gives a large increase in the fatigue strength of plain-carbon steels. Uranium-free steel has an endurance limit of 29,000 lb./sq. in. Adding 0.02 per cent. and 0.20 per cent. uranium increases the endurance limit to 36,000 and 40,000 lb./sq. in., respectively. Stress-rupture tests of SAE 1010 and SAE 1040 steels show an increase in rupture time when uranium is added. It has been found that by increasing carbon at a constant uranium level the rupture life is improved. Hardenability tests show that by adding up to 0.32 per cent. uranium to steel there is no effect, but higher uranium contents, such as 0.7 per cent., do affect hardenability.

A Nuclear Device for Keeping a Check on Blast-furnace Burden. ANON. (Iron Age, 1961, Vol. 187, No. 16, pp. 134-135.) A new control system, called "Stockray" uses nuclear techniques to detect and monitor burden level in blast furnaces. The electro-mechanical research department of the Republic Steel Corporation developed the system. The first of these was installed on an operating blast furnace in late 1958 and has been in continuous operation since with no shutdown for maintenance work. On one side of the furnace "Stockray" uses a set of radioactive sources which emit gamma rays. A similar arrangement of radiation detectors is on the

opposite side of the furnace. By a proper arrangement of the lights, a graphic distribution of the stock level is seen. Bell dumpings also can be shown on the recorder.

The detectors recognize the presence or absence of gamma radiation directed from the sources. When the stock inside the furnace obstructs a radiation beam, it obscures the signal to the corresponding detector. The output from each radiation-detector box feeds to its amplifier and control circuit in the main control cabinet. A signal light for each stock-level detector indicates when the burden drops below each detector level. Cobalt 60 was chosen as the radiation source because it produces gamma rays, noted for their penetrating power and safety. The "Stockray" installation involves two phases—radiation-beam ports and the nuclear-gauge equipment. The correct design and installation of ports is essential to the proper functioning of "Stockray." Once the ports are in place no changes can be made until the next relining.

Utilization of Fuel Gas by Injection Through Blast-furnace Tuyeres. E. R. DEAN. (Blast Furnace and Steel Plant, 1961, Vol. 50, No. 5, pp. 417-23.) During the past year, the Pittsburgh Coke & Chemical Company has substituted successfully both coke-oven gas and natural gas for furnace coke in the production of all its grades of pig-iron and spiegeleisen. The coke savings when using natural gas was greater than when using coke-oven gas. However, the relative difference was not of the same degree as the relative difference in the B.t.u. value; which indicates the reducing agents derived from the gases are more important than the added B.t.u. values benefits to the furnace. With the use of gas, extremely high-blast temperatures may be used without the loss of coke occasioned by increasing the humidity of the blast.

The greatest benefits to furnace operation, when using gas, were achieved when using low-quality or less coarse raw materials. Greater burden yields and a decrease in flue-dust production were achieved as a result of a smoother operation; moreover, additional savings were realized through the decrease in flux requirements. The economics of the coke-gas injection, or the choice of an injection fuel, will continue to depend on local conditions.

Ore Cooling in the Basic-oxygen Steelmaking Process. J. WORSMAN. (Blast Furnace and Steel Plant, 1961, Vol. 50, No. 4, pp. 338-40.) The author outlines the initial experiences with the part replacement of scrap by ore cooling. A magnetite ore was used, with the following average percentage analysis:—Fe, 63.0; S, 0.04; P, 0.02; SiO_2, 4.50; Al_2O_3, 0.70; MgO, 2.47; Mn, 0.05. The extent to which the ore could be used as a scrap replacement without producing any detrimental effect on the process had to be determined by operational experience.

When ore is charged at the commencement of a blow, the bath is at a temperature far below the ore-melting point. The ore must remain in solid form for several minutes until the various exothermic reactions have occurred, which are sufficient to supply the necessary bath temperature for dissolution. At this point, sufficient extra gas evolution and turbulence is produced to cause slopping. In an effort to minimize slopping, the ore was added experimentally at various times during the blow, but without success. A reduction of the oxygen flow was successful in reducing slopping, but the longer blowing time involved cancelled the charging time saved. The effect of ore usage on slopping was so pronounced that the weight of ore could be related directly to the amount of slopping obtained. Based on the experimental work, it was decided that not more than 2.5 tons of ore would be used as a scrap replacement for regular practice.

Electrically Heated Soaking Pits. H. C. BJERKE. (Iron and Steel Engineer, 1961, Vol. 38, No. 4, pp. 92-7.) Since 1954, the electric-soaking pit has found wide acceptance in European steel mills, which together cover the whole range of qualities, including carbon, stainless, and alloy steels. The important factors to be considered in connection with an economic analysis are cost of electric power, direct and incidental savings due to the scale-free heating, quality of heating, and the possibility of operating with a controlled atmosphere, space requirements, simplified maintenance, and simplicity of operation. Some mills generate their electric power by using their own gas, and these companies have calculated that the energy costs are in favour of electric pits if the energy consumption is less than 30 to 35 kW hr./ton.

For the electric pit to be competitive in tonnage mills, it requires hot steel with relatively short track time, and the optimum balance between fuel-fired and electric pits must be determined in each case. An interesting application for the electric soaking pits is to operate these in step with oxygen-steel plants, owing to the short track times ordinarily prevailing. The potential advantages of electric heating and atmosphere control are considerable, but have been unobtainable previously due to the lack of suitable heating elements in this temperature range. One French firm has an electrically heated forge furnace for heating alloy steels. The usual production cycle calls for preheating the 9-in. square billets in an oil-fired furnace. The preheated billets are, at the end of the day, transferred to an electric furnace at about 760 deg. C. This charge of 4.5 to 6.5 tons is heated during the evening, and soaked during the night for 6 to 7 hr. at full temperature before forging operations commence in the morning. During the day, while forging, there are several reheating operations. It has proved impossible to avoid entirely scale formation during the day, but the amount is insignificant in comparison with that formed in conventional forge furnaces, and is less than 0.01 in.

Pouring Degassed Steel in an Argon Atmosphere. W. WILSON. (Metal Progress, 1961, Vol. 79, No. 5, pp. 71-3.) Ingot moulds can be filled with argon an inert gas 38 per cent. heavier than air, to prevent ladle-degassed steel from picking up hydrogen, oxygen, and nitrogen during teeming. When preparing for argon teeming, the ingot moulds

receive regular cleaning and inspection and then are sealed. The moulds are filled with argon in the teeming order, the last mould being filled just before pouring the first ingot. In each mould, the air is displaced by argon flowing from a diffuser, lowered to the mould bottom. Using a flow of 3,000 cu. ft./hr. a 23-in. ingot mould is filled in 30 sec.

The atmosphere in a well-sealed mould contains less than 1 per cent. oxygen until the ingot is poured. Just before teeming, the argon source is attached to the stream protector, starting a gas flow 10 sec. before the nozzle is opened. During teeming, 800 cu. ft./hr. of argon flows constantly from the protector. About 20 cu. ft. of the gas is used per ingot ton. Each ingot cast in argon has a good surface and there are fewer inclusions. The forgings have passed very rigid standards for ultrasonic inspection.

Fourth Steel Plant in India

On his return to New Delhi following talks with the Export-Import Bank authorities in Washington on aid for the fourth steel plant in India at Bokaro, Mr. Galbraith, the US Ambassador in India, said the prospects of assistance appeared quite favourable. There was a great deal of sympathy for the project, he said, subject to priority being accorded to the scheme by the Government of India and subject also to the passage of the new Aid Bill in the US Congress.

Annual Statistics of Iron and Steel

COMPILED jointly by the Iron and Steel Board and the British Iron and Steel Federation, the 1960 edition of "Annual Statistics" for the United Kingdom has now been published by the Statistical Department, 7, Park Lane, London, W.1.

While this useful volume is on similar lines to past issues, attention is drawn to the following additional tables which bring the total in this edition to 121 compared with 113 for 1959. *Refractories:* consumption by ingot makers. *Gas:* quantity made, purchased and consumed by the iron and steel industry. *Stocks of Finished Steel:* these tables analyse the stocks held by consumers and merchants in greater detail than hitherto. *Tinplate and Blackplate:* consumption. *Finished Steel:* consumption by area. *Imported Steel:* receipts, as recorded by consumers. *Labour:* BISF index of output per man-year. *Exports:* BISF estimate of UK indirect steel exports.

Anyone searching for detailed statisical information regarding the British iron and steel industry should find it in this publication, the price of which is 7s. 6d.

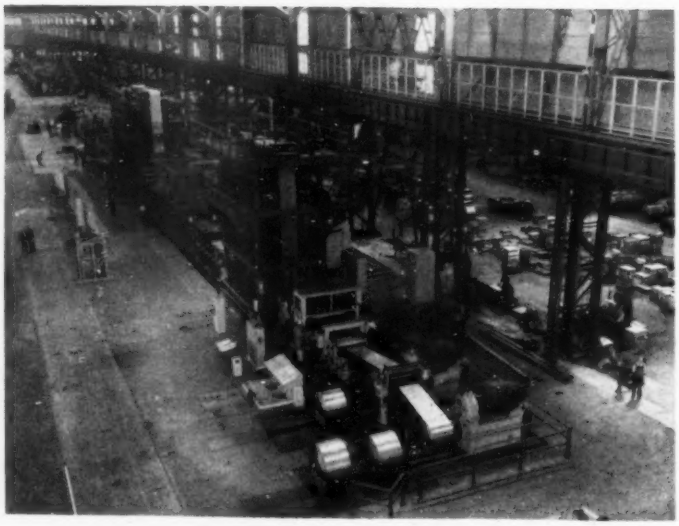
FOLLOWING laboratory tests by Pakistan's Council of Scientific and Industrial Research, arrangements have been made in the US and Germany for pilot plant research of the iron ore in Kalabagh, Pakistan, to prove the commercial value of the deposits.

NEW ELECTROLYTIC TINNING LINE AT TROSTRE

FOLLOWING a successful two-week trial run, commercial quality tinplate was produced during the first commissioning day (July 18) on the new electrolytic tinning line at the Trostre Works of the Steel Company of Wales, Limited. Twenty four hours later the line was producing material destined for export.

This line, capable of a maximum speed of 1,500 ft./min., has two unique features used for the first time in this country. These are a looping tower containing 1,000 ft. of strip storage, which enables maximum speed to be maintained during coil changeover; and a high-speed sheet classifier capable of operating at speeds in excess of 1,000 ft./min.

This new electrolytic tinning line makes a total of six lines in operation in the Steel Company of Wales, three at Trostre Works and three at Velindre.



THE THIRD ELECTROLYTIC TINNING LINE AT THE TROSTRE WORKS OF THE STEEL COMPANY OF WALES, LIMITED.

DAVY-UNITED EQUIPMENT For BHP

TWO basic oxygen steel furnaces and associated equipment such as water-cooled hoods, lances, flux chutes, and lance clamps are being supplied to the Newcastle Works, New South Wales, of the Broken Hill Proprietary Company, Limited, by the Davy & United Engineering Company, Limited, Sheffield. Much of the equipment is being manufactured at the Stockton Works of Ashmore, Benson, Pease & Company, Limited.

The furnaces are designed to hold a metallic charge weight to produce up to 200 tons of ingot steel. The furnace will comprise a furnace shell, trunnion ring, bearings, tilting drive, and fabricated drive bedplates. Each furnace will be equipped with an adjustable tap hole. The furnace shell will be of all-welded construction manufactured from mild steel, with 2½-in. thick walls and a 2¾-in. thick dished bottom and hemispherical top. The total weight of the completed shell will be 162 tons.

The trunnion ring will be a heavy box fabrication with the trunnion pin forgings, each weighing 14 tons, welded into it to form an integral fabrication. This fabrication will weigh 111 tons, and the trunnion ring diameter will be 28 ft. 7 in. with a maximum length of 39 ft. 10⅛ in. over the trunnion pins. It will be supplied fully stress relieved and finish machined. Final machining will be carried out after stress relieving and optical alignment methods will be used to ensure accuracy.

The main bearings will be self-aligning, spherical roller bearings, sealed to prevent the ingress of dust and grit and supported in fabricated housings. These bearings will each be capable of supporting a static load of 1,460 tons. Provision will be made to accommodate thermal expansion along the axis of the trunnions.

Totally Enclosed Gearing

The furnace will be tilted by drives on both trunnions through triple reduction gearing. Each unit will consist of a double reduction gearbox and a final reduction spur wheel and pinion. The spur wheel of the final reduction will be mounted on the trunnion pin by oil-injection methods to facilitate fitting and removal. All gearing will be totally enclosed. The power for tilting is to be supplied by four 100-h.p. mill-type motors, two to each gear unit.

The overall furnace height is 31 ft. 11 in., and the furnace diameter 24 ft. 1½ in.

Oxygen will be blown on to the surface of the metal by means of a copper-tipped water-cooled lance. The maximum blowing rate will be 20,000 n.c.f.m. at a lance inlet pressure of 180 lb./sq. in. gauge. The copper tip will consist of a convergent and divergent nozzle with a throat diameter of 2.80 in. The lance will be cooled by fresh water at an inlet pressure of 150 lb./sq. in. gauge and the maximum cooling water flow rate will be 375 gal./min.

The length of the lance will be 61 ft. and it will consist of an inner oxygen carrying copper tube surrounded by a mild-steel separator tube and a mild-steel water jacket. The copper tip will be made from high-conductivity oxide free copper and will be welded on to the central tube and outer

THIS PHOTOGRAPH SHOWS MANUFACTURE IN PROGRESS AT THE STOCKTON WORKS OF THE DAVY-ASHMORE GROUP OF TWO 200-TON BASIC OXYGEN CONVERTER FURNACES FOR THE NEWCASTLE WORKS IN NEW SOUTH WALES OF THE BROKEN HILL PROPRIETARY COMPANY, LIMITED. THESE ARE THE LARGEST FURNACES OF THEIR TYPE TO BE INSTALLED SO FAR IN THE BRITISH COMMONWEALTH.

water jacket, the lower part of which will be copper. Particular attention has been given to the design of the separator tube at the tip end to give optimum water-cooling conditions and prolong tip life. The design of the lance is such that when the lance tip fails the lance can be quickly broken down into its component parts for easy reassembly with a new tip. The lance will be held in position by a pneumatically operated clamp mounted on the water-cooled hood.

The fume leaving the furnace mouth will enter a water-cooled hood which is designed to accept a maximum air intake of 250,000 n.c.f.m. The hood will be cooled with sea water and the maximum flow rate will be 10,000 gal./min. The gases will leave the furnace at approximately 1,600 to 1,700 deg. C. and will leave the hood at approximately 900 to 950 deg. C. The path length of the gases through the hood will be 66 ft. Water enters the base of the hood and flows through a number of parallel vertical channels, thereby ensuring a uniform velocity of 3 ft./sec. throughout the hood. The mean temperature rise of the water passing through the hood will be 30-35 deg. F. Provision will be made at the base of the hood for increased gas cooling by the installation of water sprays.

The fume hood will comprise a rigid heavy tubular steel frame connected to the building structure and having water-cooled panels suspended inside the frame. The panels have been arranged so that expansion and contraction can take place without imposing additional stresses on the tubular frame. Each water-cooled panel is divided into 11 parallel channels giving a total of 132 vertical channels extending over the full height of the hood. The connections between panels are made by flexible hoses and a control valve is fitted at the inlet to each channel.

A further spray chamber section has been designed at the top of the hood and forms an integral part of the hood. Three rows of spray nozzles are positioned approximately 15 ft. from the hood outlet and are arranged circumferentially around the hood to cool the waste gases.

PRODUCTION AT ROURKELA STEELWORKS

UNSATISFACTORY production at the Rourkela steelworks was attributed by Mr. Sambasiran, steel plant general manager, to the quality of ore at Barsua, with only 58 per cent. Fe compared with 64 per cent. Fe at Bhilai, and poor coal with a 24/25 per cent. ash content, according to a report in the Hindu Weekly Review. He also blamed flooding, the entire works being under water at the last monsoon.

Parts of a third blast furnace ready for over a year had been removed to maintain the other two in operation. These two had a proved capacity of 60,000 tons a month, but had only averaged 33,000 tons a month in 1960. This has improved to 37,500 tons a month for January-May this year. Repair work on the Rourkela slabbing mill, which broke down on June 17, is now completed.

Electrically Operated Soaking Pits at SCOW

TO control the formation of scale in special steels during the reheating process three electrically operated soaking pits have been constructed and put into operation at the south end of the existing pits in the slabbing mill of the Steel Company of Wales, Limited.

Electrical heating was adopted to control oxidation and limit slag formation. In addition to reducing repair costs and loss of steel by excessive oxidation, it is possible with electrical heating to achieve the high temperature required for special steels, hitherto only obtainable in slab furnaces. Thus, the elimination of a reheating stage will permit direct rolling from ingot to strip.

The new pits are of 100 tons capacity, each containing six cells accommodating together 12 8-ton ingots. Each pit is supplied with electricity from a 2,400-kW. transformer, and control is entirely automatic.

As the soaking pits are completely sealed, any desired atmosphere may be employed to control ingot scaling. A certain degree is, of course, desirable to eliminate surface defects and is effected by the injection of air or suitable gas controlled by an alarm panel.

There are a number of control panels, one of which incorporates indicating lamps enabling the operator to tell from a distance whether a pit is still heating or just soaking.

WELDING ENGINEERING EXHIBITION

FORMING an integral part of the Institute of Welding's spring meeting, Welding Engineering 1962 will be the first exhibition organized by the institute. The meeting will be held at Buxton (Derbyshire) from April 30 to May 4, while the exhibition will be from May 2 to 4. The latter, marking the progress made by the welding and allied industries in this country, will be a development of the displays and demonstrations at previous meetings.

The exhibition will cover all processes and techniques with which the institute is primarily concerned and there will be sections devoted to research and education, a display of detailed illustrations of welded construction by industrial corporate members of the institute, and a stand where welding publications from all parts of the world will be on show.

Exhibits will illustrate the theme of the spring meeting, which is "Welding for Power Generation."

Further details of the meeting and the exhibition may be obtained from the Institute of Welding, 54, Princes Gate, Exhibition Road, London, S.W.7.

Ironstone Workings and Land Restoration

PRODUCTION FROM THE JURASSIC MEASURES

Ironstone mining, whether by open-cast or underground methods, incurs particular problems in connection with the actual working of the ironstone and the after-treatment of the worked-out land. In a paper, of which extracts are here given, presented at the Chartered Surveyors' annual conference at Leicester on July 6, Mr. R. J. Cowan outlined the geological distribution of iron ore in Britain and described the mining methods employed in Northamptonshire, Leicestershire, Rutland, and south Lincolnshire, which are now the main producing areas.

GEOLOGICALLY, iron ore is fairly widely distributed in Great Britain and falls into three main categories:—(1) The unstratified hematite ores in the Carboniferous Limestone and Lower Carboniferous systems; (2) the Coal Measure iron ores in the Upper Carboniferous system; and (3) the stratified ironstone in the Jurassic and Cretaceous systems.

The hematite ores are chiefly found on the west coast, and the only active workings are in Glamorgan and the north-west corner of Lancashire and Cumberland. They are replacement deposits which occur sporadically in highly inclined veins or irregular shaped bodies and are worked by underground methods of a specialized nature.

The ore is of high grade, having an iron content in the region of 50 per cent. It is also low in phosphorus and is now mainly used for making special types of iron. Production has steadily declined over the past 40 years from an annual figure of 1,600,000 tons to the present capacity of a little under 500,000 tons.

The Coal Measure iron ores, referred to generally as the clay band and blackband ores, occur in beds varying in thickness from 5 to 18 in. Production was fairly extensive in the 19th century, but has steadily declined until now only small quantities are produced in the Potteries for special purposes.

Jurassic and Cretaceous Iron Ores

The principal stratified ironstone series are to be found in the Jurassic measures which run in an unbroken line from the river Tees southwards through Yorkshire, Lincolnshire, Nottinghamshire, Leicestershire, Rutland, Northamptonshire, Warwickshire, Oxfordshire, Wiltshire, and Gloucestershire to the coast near Weymouth. The main beds are the Frodingham, the Marlstone, and the Northampton Sand Ironstone. All three have similar chemical characteristics, but must, because of their importance, be considered separately.

The Cretaceous ores are geologically extensive, but at the present time are relatively unimportant economically, being worked only in the Claxby Bed near Nettleton, where production runs at the rate of about 170,000 tons a year.

The Frodingham ore found in north Lincolnshire is the earliest of the Jurassic beds and has its horizon in the Lower Lias clays. The bed has a normal thickness of 32 ft. with a low iron content of between 18 and 25 per cent. It is limey in character, varying between 14 and 21 per cent., and is thus suitable for use in the furnaces in conjunction with the siliceous Northampton Sand Ironstone and foreign ore of high iron content. Owing to the sudden rise in the escarpment, the future winning of this ore is almost certain to be underground, but despite this fact, production has been more than doubled over the past 10 years to nearly 5,500,000 tons.

The Marlstones are located at the top of the Middle Lias series and are found in the Cleveland district and in two main areas in the Midlands. The Cleveland district was the first major producing area in this country, production starting about 1836 in the Esk Valley. The main seam was discovered in 1850 near Eston, and by 1880 Cleveland was producing 6,500,000 tons of stone a year—more than a third of the total British output. Production has steadily decreased since the turn of the century and is now less than 500,000 tons a year, which is obtained entirely by underground mining.

The south Lincolnshire and Leicestershire Marlstone has a low iron content of 20 to 28 per cent., but this is compensated by an increase in the lime content which provides a self-fluxing ore. The workable stone generally lies under shallow overburden consisting of clays and tractable material which is fairly easy to handle by modern methods. Over the past 15 years production has steadily decreased as the bed became exhausted.

The Oxfordshire and south-west Northamptonshire Marlstone is similar in character and is

mostly found under extremely shallow cover. During the period 1946 to 1957 production was trebled and now stands at about 1,500,000 tons a year.

Northampton Sand Ironstone

During the period of deposition of the Upper Lias Clays conditions were not conducive to the precipitation of iron minerals, but at the base of the Lower Oolites, the Northampton Sand Ironstone was deposited. This bed is one of the most important in Britain and is worked from Lincolnshire across Leicestershire, Rutland, and Northamptonshire.

The overlying strata consist mainly of Estuarine clays and Lincolnshire limestone, which is hard and massive in character and in some places reaches a thickness of 130 ft. The outcrop of the ironstone formation, together with its overlying limestone, form a characteristic feature of the east Midlands, sometimes known as the Oolitic Cliff. This escarpment stretches in an unbroken line from the river Humber to the river Welland.

The ore bed itself varies in thickness between 12 and 25 ft., of which only 6 to 14 ft. are worked. The iron content of the workable bed is generally between 28 and 34 per cent. as quarried. As its name implies it is on the whole a siliceous ore, but because it is a sedimentary deposit its composition varies greatly from area to area, and within each area. There has been an extensive development of this field and production has steadily increased to well over 8,000,000 tons, which is about half the total production of iron ore in Britain.

Early operations for winning the stone started in the outcrop along the valleys, working into the hillside, the soil being the first taken off and put to one side; both the overburden and the ironstone were then removed by hand, the method of developing being to wheel the overburden in barrows over long gantries and to tip it in the excavated areas. Finally, the surface soil was replaced and the land returned to agricultural use.

There were severe limitations to this method of working and to the outputs which could be obtained. As recently as 1911 leases were granted giving the right to abandon ironstone lying at a greated depth than 20 ft. as being commercially unworkable.

Development of Excavating Machinery

With the ever-increasing depth of overburden and the presence of limestone the method of stripping became largely centred on the building of larger shovels. In 1917 a long jib shovel was imported from America and put to work near Corby. By 1924 the Ruston 200 steam shovel with a 4½-cu. yd. bucket was in use, and finally, in 1933, came a further advance in overburden stripping when the first of the electrically operated Ransomes & Rapier 5360-type shovels was built in this country. This type of machine weighs 500 tons, has a 9-cu. yd. bucket, a dumping height of 68 ft., and a dumping radius of 101 ft. It was designed to strip all types of overburden to a depth of about 60 ft. and many are still in general use.

At about the same time the first walking draglines of the 5.W. type with a 135-ft. boom and a 3½-cu. yd. bucket were used in the Northamptonshire ironstone workings. They had been introduced into Europe from America in 1930, when they were used for canal work in the Low Countries. As the necessity for developing still deeper areas arose, very large walking draglines, also developed in America, were introduced into the orefield in 1950. These machines were capable of handling 75 ft. of overburden in one operation. Even this capacity was not sufficient and shortly afterwards a British built machine of a similar type was introduced which could handle up to 100 ft. There are now three of these machines in operation, the latest of which has a boom length of 303 ft., a bucket capacity of 22 cu. yd., and weighs 1,775 tons

Planning and Layout of Quarries

The major factors affecting the planning and layout of an area and the type of mechanization are its shape and size, the dip of the iron-ore bed, and the depth and nature of the overburden. The size will be governed by topographical features, such as roads, rivers, railways, streams, and villages.

Wherever possible, initial excavations commence in the area containing the minimum depth of overburden. It is also advantageous if this coincides with the lowest point of the iron-ore bed, which enables a drainage system to be installed in the floor of the quarry.

The final choice between a shovel-type excavator or a dragline is largely dependent on the overburden and the proximity of suitable adjacent areas. The large walking draglines require a firm foundation from which to operate and are normally located on the uppermost level of the limestone beds.

Should any part of the area to be worked exceed the maximum working depth of the stripping machine it is possible to overcome the problem by the introduction of auxiliary machinery, such as a smaller dragline, located on the spoil side which handles any excess, or by the removal of excess overburden in advance of the operation by means of scraping machinery.

Due to working at great depths, and the limitation in height at which spoil can be dumped, the question of swell in the overburden has necessitated the development of quarries in the form of an arc, working towards the centre. Calculations are made to decide the degree of curvature required, taking into account the total depth of overburden, the thickness of iron ore extracted, the dumping radius of the stripping machine, and the percentage swell, which is of the order of 20 to 30 per cent.

The ideal method of open-cast working in deep overburden is to open up the pit in a semi-circular fashion having an entry at each extremity. In

addition to the maximum dump room that this method gives, it has the additional advantages that the stripping machine has a clear swing at each end of the pit so that the machine loading the iron ore can work clear and the railway can be run out at the far end, thus ensuring a continuous supply of wagons. Unfortunately, it is not often that such ideal conditions can be obtained and it is normally necessary to develop from one point of entry only.

Except in the case of the softer outcrop stone, it is usually necessary to drill and blast the iron ore before loading. Occasionally a maximum lump size may be stipulated by the receiving works because of size restrictions at the plant. After ensuring that the surface of the bed is free from overburden contamination a regular drilling pattern is adopted to give uniform fragmentation and reduce to a minimum the amount of secondary blasting required.

The method of transport to be adopted for the iron ore depends on the development of the area in relation to the availability or possibility of linking up with a private or public railway system.

Restoration

With the advent of the large stripping machines the problems of rehabilitation increased. The shovels had a rigid arm and the large draglines a direct motor-controlled dragrope which caused the spoil to be dumped directly under the boomhead. The result was to leave the overburden in a ridge-and-hollow formation.

Mining operations now come under the control of the planning authorities and the degree of restoration is laid down as a condition of the permission to win and work the ore. In general, it is provided that the overburden shall be levelled to contours which facilitate natural drainage and permit the resumption of normal agricultural operations. Provision is also made for a limited amount of surface soil to be stripped separately and re-spread over an equivalent area of levelled land.

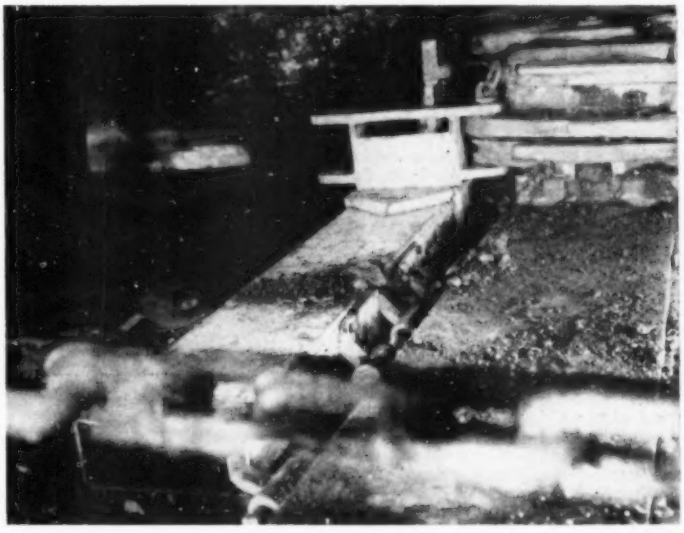
The Mineral Workings Act, 1951, established an Ironstone Restoration Fund under the control of the Minister of Housing and Local Government to provide money for the restoration of land worked for iron ore by open-cast methods. Payment into the fund is made at the rate of 3d. per ton on ironstone extracted. The producer contributes 2¼d. per ton, but can recoup 1¾d. per ton in respect of leased minerals by deduction from royalty payments. The extra ¾d. per ton is added from the Exchequer. In addition, the producer is required to carry out restoration at his own expense up to a limit of £110 per acre.

The local authorities have made use of the fund to restore areas which were left out of agriculture as a result of ironstone workings prior to 1950 and this has resulted in the return to agriculture of some 2,000 acres. Only a very small acreage of such land is left and it will no doubt be dealt with during the next year or two. Since 1950, ironstone operators have restored their current workings progressively to agriculture and approximately another 4,000 acres has been dealt with in this way.

Hollow Ventilating Gummer Bar

THE National Coal Board's Central Engineering Establishment, Bretby, is experimenting with a device for ventilating the undercut made by coal-cutting machines to dilute and cool inflammable gases which collect in the undercut.

The device comprises a rectangular tube mounted by means of brackets to the undercutter in such a position that it acts as a hollow gummer bar. Water sprays are placed in the tube and fed from the colliery supply under pressure, so that as the water is projected towards the outlet of the appliance (which is near the back of the undercut) it entrains air drawn in through the tube's inlet end and an air-and-water mist is projected to the back of the undercut.



THE HOLLOW VENTILATING GUMMER BAR.

New Literature

HOUSE magazines, catalogues, booklets, and other publications received include those referred to below. Readers wishing to obtain a copy of any of the items should write direct to the address given, at the same time mentioning this journal.

ALUMINIUM DEVELOPMENT ASSOCIATION, 33, Grosvenor Street, London, W.1—Articles on "Aluminium Motor-car Cylinder Blocks" and "Aluminium Returnable Containers" are among the features of the latest (June) issue of the Aluminium Courier (2s. 6d.).

CROFTS (ENGINEERS), LIMITED, Bradford 3 (Yorks)—The company's range of geared motors and reduction gears is described in publication 617, which gives brief details of the various units and refers to other publications issued by the company in which fuller information is given.

BROKEN HILL PROPRIETARY COMPANY, LIMITED, Melbourne, Australia—A description of the new sinter plant at the company's Newcastle Works is given in the June issue of the BHP Review, which also contains articles on "Adding Lead to Steel," "Manufacture of Welded Tubing," "Raw Materials for the Open Hearth," and "Port Kembla's Ingot Mould Foundry."

HOT DIP GALVANIZERS ASSOCIATION, 34, Berkeley Square, London, W.1—"Hot Galvanizing—the Process and the Product" is the second in a new series of technical booklets. It describes the hot galvanizing process and contains notes on the formation of alloy layers, spangle, corrosion resistance, fabricating, and methods of finishing. It should prove helpful to technical students, engineers, architects, and builders seeking basic information on galvanizing and its uses.

FEDERATION OF BRITISH INDUSTRIES, 21, Tothill Street, London, S.W.1—Noise is acknowledged to be one of the main problems of the present age. It is something that afflicts us more and more in almost every walk of life. Noise in industry is discussed by Paul Nugat in an article in the August number of FBI Review (2s. 6d.). Mr. Nugat describes how individual sources of noise may be located and the level reduced and discusses the research into the problem which is currently being conducted.

OLDHAM & SON, LIMITED, Denton, Manchester—The company is within four years of celebrating its centenary. Plans for future development continue to be made and reference to them was made by Mr. John Oldham, chairman and managing director, speaking at a luncheon at Blackpool on the occasion of the annual works outing. For once, the weather was unkind to the Oldham employees, but, judging from the pages of pictures published in the summer number of the Grid, a good time was indeed had by all.

BRITISH OXYGEN COMPANY, LIMITED, Bridgewater House, Cleveland Row, St. James's, London S.W.1—"I am just the sort of man who, if I were asked what copper nitrate is, would reply in all ignorance, that it is overtime pay for policemen," said the Rt. Rev. F. D. Coggan, when Bishop of Bradford and now Archbishop of York, in his speech at the company's 75th anniversary dinner at Guildhall. Needless to say, most of Mr. Coggan's address, which is reported in the August issue of Pennant, was in rather more serious vein.

WAILES DOVE BITUMASTIC, LIMITED, Hebburn (Co. Durham)—"Hermastic" chemical resisting and masonry paint, a new product, is described in technical leaflet No. 22. Obtainable in a variety of colours, the makers claim that "Hermastic" has many advantages over the more orthodox paint systems. It is based on a synthetic co-polymer type material which enables it to withstand the effects of chemical fumes, splashes, and mists, and of oil, both mineral and fatty. "Hermastic" is unaffected by humidity and condensation and is heat resistant up to a temperature of 250 to 300 deg. F., depending on prevailing conditions.

ROUND OAK STEEL WORKS, LIMITED, P.O. Box 3, Brierley Hill (Staffs)—It was on the first day of spring, 1918, that Mr. H. Bennett joined the staff of the company. He had just left school and he was drafted at once into the fitting shop. He is still in that department, and is, in fact, the fitting shop foreman. Mr. Bennett has, inevitably seen many changes and he contributes a short article on the subject to the summer number of the Acorn. He says: "If I were asked what makes a good maintenance man or fitter, I would suggest: a great deal of patience; the ability to use one's hands, skill, training, and that indefinable something called 'know-how'—the ability to weigh a job up quickly and effect repair with minimum delay to production." There is another interesting article by Mr. H. B. Bloore, finishing mills manager, who writes on the "Tale of a Roller," and various other contributions which go to make the Acorn a very readable magazine.

INTERNATIONAL NICKEL COMPANY (MOND), LIMITED, Thames House, Millbank, London, S.W.1—The important role which nickel plays in practically every branch of industry is emphasized in the latest (June) issue of the Nickel Bulletin. Subjects covered in the nickel section include the physical properties and the determination of the metal and the low-temperature characteristics of nickel/cadmium batteries, while in the following electrodeposition section attention is directed to literature on, *inter alia*, the corrosion-resistance of nickel/chromium electrodeposits, double-layer-nickel plating processes, and industrial plating of screws and bolts. Items on the properties and applications of non-ferrous alloys are followed by sections on nickel-iron magnetic alloys and nickel-containing cast irons (the latter including a reference to the requirements of an ASTM specification covering austenitic cast irons). Literature on structural steels is represented by abstracts indicating the scope and findings of work on the properties of high-strength steels, non-magnetizable steels, and, in particular, a 13 per cent. nickel steel for low-temperature applications. In the section concerned with heat- and corrosion-resisting materials attention is drawn to four compilations of published data on the physical and mechanical properties of representative nickel-containing high-temperature materials, to structural studies of nickel-base alloys, to work on the corrosion behaviour of aluminium-nickel alloys, and to papers reporting research on the mechanical properties, structural characteristics, and corrosion-resistance of chromium-nickel stainless steels.

MALAYAN IRON ORE FOR JAPAN

THE Federation of Malaya is expected to sell a record volume (about 6,000,000 tons) of iron ore to Japan this year. Last year more than 5,000,000 tons went to Japan; sales have been increasing steadily over the past three years.

In 1959, the Federation produced only about Straits $120,000,000 worth of iron ore. During the first nine months of last year alone, however, Malaya produced about 500,000 tons more than during the whole of the previous year. Nine Japanese steel companies have entered into agreements with as many Malayan firms for the supply of iron ore.

DISCUSSION

Accidents in Mines

SIR ANDREW BRYAN'S NACM CONFERENCE PAPER

In the chair at the session of the 1961 annual conference of the National Association of Colliery Managers at which Sir Andrew Bryan presented a paper on "Accidents in Mines" was Mr. T. A. Rogers, HM Chief Inspector of Mines. Sir Andrew in his paper, which was published in our July 21 issue (page 133), emphasized the need for "positive and dynamic action" in the matter of accident prevention. The subsequent discussion is reported below.

MR. T. A. ROGERS, HM Chief Inspector of Mines, said it afforded him great pleasure to preside over that session of the conference, not only because of the subject of the paper, but also because it was always a great pleasure to be associated with Sir Andrew Bryan.

MR. W. A WOOD asked if Sir Andrew would give his views on the subject of coal face lighting. If there were good mains lighting at the face—in fact, flood lighting—could they not expect a substantial reduction in accidents, he asked. Up to now only puny attempts had been made to light the coal face. Mr. Wood said he much appreciated the efforts of the NACM to encourage safer mining by making it the subject of the conference. It gave him great encouragement and help in his new appointment as the NCB's chief safety engineer.

The better the illumination the better it would be for all concerned, said SIR ANDREW in reply. He would be in favour of improving general lighting so far as that was possible practically, without introducing too many additional risks. In the past, general lighting at the coal face had not been entirely successful because of the physical conditions applying and the occurrence of breakdowns.

Importance of Morale

Sir Andrew Bryan, replying to another question, said he had no hesitation at all in saying that a high morale was an absolute essential to a low accident rate. It should be made obvious to everyone in the pit that management was interested in accident prevention, and it must be made obvious by example as well as by word of mouth. Anything that could be done to improve industrial relations, to make a man feel that he was not just a cog in the wheel, that he had a good and a particular job to do, would raise his morale, and would undoubtedly do a great deal to reduce accident rates.

MR. H. E. TYSON suggested appealing to people's pockets by way of money prizes. Did Sir Andrew think that if the Ministry of Pensions and National Insurance was to introduce a kind of "no-claim bonus" they might get a spectacular reduction of sickness and accidents. He himself thought there was something in this. He wondered also if the doctors knew how many manshifts were lost by their patients because of accidents. It was his experience that when a man who had met with a slight accident went to a doctor and was given treatment he would be told to come again, not on the following day, but "one day next week."

Mr. Tyson suggested that the three-day waiting period should be done away with altogether. If a man was off work for only three days he did not get paid for those days; if he wanted to get the three days' pay he had to be off for another 12 hours. Many men nowadays were having a fortnight off in order to get paid for the three days. He felt quite certain that the National Insurance people would actually save money if they paid in respect of only one day.

SIR ANDREW BRYAN thought that Mr. Tyson's suggestions were very interesting. He was not sure that he ought to venture an opinion about paying sickness benefit on one day or three days; but the point was worthy of consideration.

Delay in Getting Facts

MR. C. F. PALMER said that Sir Andrew had advised that the best way in which to tackle the accident problem was by objective analysis. To follow that advice, they must have the facts, and getting them was one of the difficulties. Often the facts did not come out until two or three years after an accident had occurred. He asked what Sir Andrew thought to be the best incentive to offer people to tell the truth after accidents, so that a proper objective analysis could be made.

Regarding explosions, Mr. Palmer said that some people, taking the long view, had been a little more objective in their approach than had others, and had said that these accidents had occurred in winter, when the air had come down to the pits saturated and the dust in the pits had been primed thereby for a gas explosion. He asked if Sir Andrew could say, from his association with investigation of these occurrences, whether there was any truth in that suggestion.

SIR ANDREW BRYAN replied that if, after an accident had occurred, someone went down and made a very close study of all the circumstances, he would get the facts. The more skilled the observer, the more factors he might learn about—vital factors contributing to the accident. If human beings did something they should not do and refused to say what it was, he did not know of any means which would

make them tell. Clearly, if propaganda and education and training were going right, there should be very few people deliberately doing things they should not do. To try to make people tell the truth was a very personal matter.

With regard to dust and humidity, if the people in the pits carried out the regulations, if they did what they were told to do, he did not think there should be any danger either in winter or summer. There were instructions laid down to render the dust harmless.

Structure of Management

MR. T. SMITH said Sir Andrew had stated that it was most disappointing to find that the increase in supervisory and inspectorial staff had not brought about the desired and expected reduction in the accident trend. Those who were concerned with colliery management were bound to agree with him. But there must be some fundamental reason for this, and Mr. Smith suggested that the answer lay somewhere in the structure of management. Obviously, if the machinery had been set up and the desired results had not been obtained, there must be some cog in the gear train not functioning properly, or the very nature of the gear train itself was fundamentally wrong.

He thought there was an analogy to this situation in the political structure of a country. For example, at one time the King was the supreme ruler of every country, but with the increase in complexity of the social structure of the country it became necessary for governments to be set up with a cabinet of ministers whose departments functioned independently, while at the same time maintaining a certain degree of co-ordination, without constant reference to the Prime Minister.

Did Sir Andrew agree that the time had come to have an immediate reappraisal of management structure, particularly at the large collieries, so that they could correspond with the complex changes in technique and administration which had developed over the last two or three years?

SIR ANDREW BRYAN said that unless all the people concerned with management worked together as a team, no matter who the manager was, he would be let down from time to time. Generally, this was not a job for one man; but the one man who was leading the team must inspire them. If he did not show that he believed thoroughly in accident prevention, if he had a scheme to put over and did not take every conceivable means to ensure that the scheme was carried out, it was not likely that it would be successful. There should be a co-ordinating function, and Sir Andrew felt that the safety department had a job to do in that respect.

There was room for improvement in the safety service build-up. Although safety officers had interest in the job, not all of them had the standing or the education or training to make them effective in convincing other people that they must get something done in order to prevent accidents. There was scope for the raising of the standard in that respect. He hoped that before long somebody would give a really good discourse on what the safety service did, and on questions such as that of paying attention to the man in the pit.

Value of Small Groups

DR. WILLIAM REID (chairman, Durham Divisional Coal Board) said that they had to do much more to reduce the overall accident rate, because that rate had a fundamental part to play in the whole safety atmosphere of the pit. Where there was a high overall rate it was more likely that there would be serious accidents or even a major disaster. A way to tackle the problem was to try to get the men in small groups working under local leadership. For a leader or supervisor to have a different group of men every week was wrong. The supervisor who looked after the same group of men continually would know the accident rate for that group and he would always try to achieve better results; he raised the morale of his group. In a small pit the manager could tackle every man to get better results; we should have leadership of small groups in the larger pits as in the small pit itself.

With regard to holiday pay, sickness benefit, and so on, he hoped the idea of looking into individual cases would be followed. He had come across men who had had 12 accidents in a year.

MR. F. H. BAKER recalled an experience a few weeks previously when attending at Scarborough a conference of the Royal Society for the Prevention of Accidents. At that meeting there was presented to a director of a well-known building firm a trophy in recognition of the firm's work in accident prevention. The firm employed some 20,000 people.

During the conference he had been in conversation with a delegate who had been a colliery safety assistant, but was now employed by a well-known company in charge of safety for a group of workers. When asked how many men were employed at his works he had said there were 500; at the colliery where he was formerly safety assistant there were 1,100. When asked if he had doubled the salary he had received when he was employed by the Coal Board he did not reply, but he had looked very satisfied.

Mr. Baker mentioned this because the Scarborough conference was attended by as many as there were present at that NACM conference, devoted to safety, and there must have been very few of the delegates at Scarborough who were responsible for the safety of more than 1,000 people. Yet they were all men of standing, having comfortable jobs, in close touch with their directors—and they had expense accounts!

A Question of Status

SIR ANDREW BRYAN said that in his view the status of the safety men at the pits was not high enough to make itself felt. Clearly, that was a matter which affected the structure of management, and undoubtedly there was room for a full inquiry into it. There were plenty of inspectors and so on, but somehow the whole thing did not "click."; there was room for operational research just to see what everybody was doing, to try to get things working better. If there was at the pit a man of standing who had the responsibility for safety, he should certainly have the status of an under-manager. A man like that in any pit of reasonable size, if he really got down to the problem, would make a very great difference.

MR. H. R. HOUSTON said that, as statistics showed, especially in recent years, there had been a tendency for things to go wrong on the surface. The accident rate on the surface was really a disgrace; it did not compare with rates in other heavy industries in the country. He asked if Sir Andrew could provide any ideas on how they might tackle that particular problem.

Sir Andrew had said it should be possible for the various people engaged in the safety services to reconcile their independence and their loyalties to their principals. What did he mean by that? Did he mean that HM Inspectors should take over the Coal Board safety system and safety officers, or that the Coal Board should take over HM Inspectors?

There was no doubt whatever that if top men in

management showed their interest, if they showed that they really meant business, safety progress would be accelerated. They had an example in Durham, where the chairman of the board not only had the "impertinence" to interfere, but had had the courage to start a safety campaign. It was not every chairman who was prepared to stick his neck out and to go for a thing.

Sir Andrew had said that they needed to extend their efforts beyond the pit. Having seen a good deal of mining in various parts of the world, Mr. Houston said it stood out that where the colliery manager took an interest in the community, apart from the actual production of coal and the running of his colliery, where he took an interest in the band, the football team, and other local activities, the accident rate was better than in other places.

The personal factor had been referred to as being misunderstood. In this connection he said that at an international conference he had attended a few weeks ago a delegate had spoken of the importance of the personal factor in accidents. There was an immediate and violent rejection of that view from the Russians, who had banged the tables and said that it was nonsense, that it was ridiculous to blame the workmen and that it came from the owners, the directors, and the managers.

Comparison with Other Industries

SIR ANDREW BRYAN, dealing with the point that the accident rate on the surface at collieries appeared to be much higher than that in other industries, said people were asking why. Mining conditions could not be blamed for what happened on the surface. It had come to him only recently that accident rates in some of the most up-to-date workshops in the country, having the best designed equipment, seemed to be higher than in other places which could not compare with them in standards. Clearly there must be something more than the actual conditions of the works.

It would be valuable to get at the causes of the differences. A group of factories and the work they did might be examined to see if there were differences in the recording of accident rates. Perhaps they would find that the mining industry in that respect was not anything like so bad as it appeared to be.

It had been said that there was room for more co-ordination. Sir Andrew held that the nationalized coal industry should see to its own safety standards, maintain them, and even regulate for them. As had been said on a previous occasion, it was the responsibility of the Coal Board to run its own industry and have its own rules. It should not be dependent on outside people to tell them in the coal-mining industry just what they had got to do. At the same time, he was quite convinced that there was room for further improvement within the industry itself, from all sides.

Commenting on Mr. Houston's remarks concerning the importance of taking an interest in the local community, Sir Andrew quoted from an OEEC report, relating to the General Motors' safety programme, in the United States, which said:—

"Special attention should be given to off-the-job safety, as employees have more accidents away from work than they do on the job. Our objectives should include efforts to promote the safety of employees and their families; by maintaining a comprehensive safety programme for employees driving company-owned vehicles; providing material on highway safety to aid employees driving their own cars; encouraging employees to develop safe practices in the home, on the farm, and in recreational activities; participating in community safety activities. Each year General Motors offers outstanding new products to the public. Each year we try, and succeed, in making them better. What we do product-wise we have done and should continue to do safety-wise through the conscientious observation of these basic safety principles."

Sir Andrew said that clearly this was all part of the plan to be more safety-minded, and there was a lot to be said for management taking a real interest in the affairs of the community.

MR. R. WILLIAMS (past president), who proposed a vote of thanks to Sir Andrew, said it was always a pleasure to do that, for the association was always in Sir Andrew's debt.

LIGHTNING PROTECTION FOR COLLIERY STRUCTURES

OBJECT of a good lightning protective system is to enable high electrical discharge from the atmosphere to be conducted safely to earth by one or more conductors. This is particularly important for buildings containing explosives, for tall chimneys, or for structures which house electrical apparatus or which are normally occupied by a number of people.

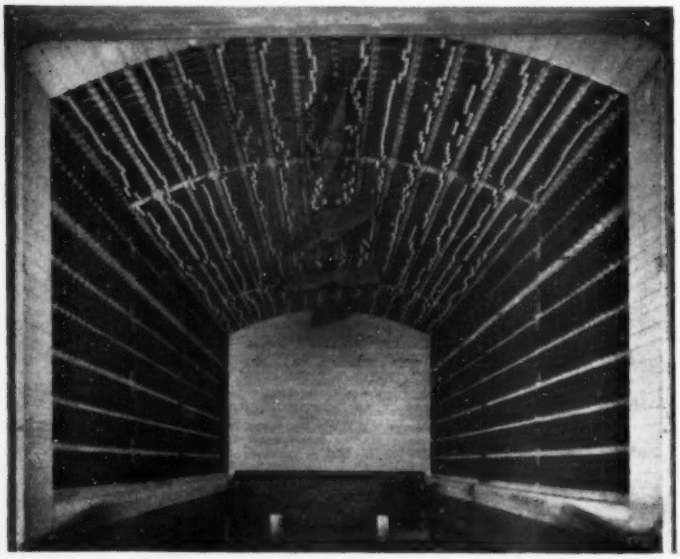
General guidance on the measures to be taken to ensure that colliery surface structures are given adequate protection against the effects of lightning are given in Information Bulletin 61/223, issued recently by the production and reconstruction department of the National Coal Board. Much of the information contained in the bulletin is drawn from the BS Code of Practice, CP326.101 (1948).

A single lightning conductor affords a restricted zone of protection, which takes the form of a cone with the conductor at its apex. A building or structure is fully protected only if it lies wholly within this conical zone. For large buildings such a conductor would have to be excessively high; the alternative is to provide a conductor at each end, bonded together by a roof conductor along the ridge of the roof, or several air terminals and down conductors which are connected to a conductor laid around the perimeter of the roof and to a network system of roof conductors covering the whole area of a flat roof.

To protect buildings housing explosives or highly inflammable liquids special measures are required; at least two lightning conductors should be erected outside the building and particular attention paid to earthing. Tall buildings, such as headgears, tower winders, and chimneys must also receive special consideration to ensure adequate protection and to give facilities for testing. The testing of a complete installation necessitates accurate measurement of resistance to earth and continuity of conductors. The efficacy of all bonds and joints must also be checked.

New Stress-Relieving Furnace at Redcar

FURNACE for stress-relieving large fabrications and castings weighing up to 40 tons, supplied by the General Electric Company, Limited, to Dorman Long (Steel), Limited, is installed in the company's Redcar works and is capable of operating at a maximum temperature of 1,000 deg. C. The furnace is of the bogie-hearth or car-bottom type and has a door opening 10 ft. wide by 7 ft. high to the spring of the arch, and a heated length of 20 ft.



INTERIOR VIEW OF THE 600-kW GEC BOGIE-HEARTH TYPE FURNACE INSTALLED AT THE REDCAR WORKS OF DORMAN LONG (STEEL), LIMITED. THE CENTRIFUGAL FANS AND HEATING ELEMENTS ARE CLEARLY VISIBLE.

The walls of the furnace consist of high-grade semi-refractory blocks backed up with insulating brickwork, while the roof, which is of arched construction, is built up from special semi-refractory shapes backed with insulating brickwork and powder.

The heating elements, which are made of high-grade nickel-chrome strip, are arranged on the side walls, roof, and door. With all elements in circuit the total rating is 600 kW., comprising 60 kW. on the door and 540 kW. arranged in four zones of equal length and power input. When the temperature reaches 10 deg. C. below the required value the input to the elements is automatically reduced to one third of the maximum rating by means of star/delta contactors housed in the main switchgear cubicle. Four large-diameter centrifugal fans are provided in the roof of the furnace to increase the rate of heating and to ensure an even temperature distribution throughout the charge. Each fan unit is water-cooled and is mounted in a heavy fabricated stool bolted to the top steelwork. The impellers and shafts of the fans are constructed from heat-resisting materials.

The furnace door is fitted with counterbalance weights and can be raised quite easily by means of a handle which is mounted at the side and operates through gears. Eccentrically mounted cams fitted to the door-lifting gear ensure that, when the door is closed, there is intimate contact between machined faces on the inside of the door and on the furnace front plate so as to prevent heat losses. Interlocks prevent the furnace from being switched on until the door is fully closed.

The furnace bogie consists of a rectangular steel structure, the top of which is covered with a castable refractory material suitable for carrying the charge. This material is held in position by easily removable steel plates. A sand sealing channel is fitted on the two sides and front of the bogie, but the rear end of the bogie is made to pass through the back wall of the furnace so that sand sealing can be effected from the outside. The bogie is carried on 12 single-flanged wheels, and is moved into and out of the furnace by means of a motorized wire-rope winch. The winch is fitted with an electromagnetic brake and a geared limit switch which automatically interrupts the supply to the driving motor at both ends of the bogie travel.

Four indicating control pyrometers, one for each heating zone, are mounted in the control cubicle which also contains a six-point graphic recorder. The pyrometers are of the millivoltmeter type, complete with a broken-thermocouple protective device. Each instrument is fitted with two mercury switches which are used for controlling the supply to the heating elements.

FRENCH IRON-ORE OUTPUT in May totalled 5,630,869 tons, against 5,495,750 tons in April. Home deliveries rose to 3,442,888 tons, against 3,349,338 tons. Exports to the Saar amounted to 664,052 tons in May, compared with the April figure of 741,521 tons.

CRUDE STEEL PRODUCTION in Italy increased by 9.7 per cent in the first half of this year to 4,522,000 metric tons. The corresponding 1960 figure was 4,120,000 tons. Pig-iron output was 1,484,000 (1,267,000) tons and production of ferro-alloys 69,220 (59,886) tons.

IRON AND STEEL TRADE

THE present position is that very few mills are working more than a fortnight ahead of their order-books, and in some cases deliveries can be made in even quicker time. This situation applies particularly to plate and the full benefit of the two new mills is unlikely to be experienced until there is a much bigger demand, especially from the shipyards. Exports of heavy sections and joists are, in the main, being maintained at about last year's level, but the Canadian market for universal beams has fallen away to some extent now that Canadian customers have home supplies at their disposal.

Pig-iron

The demand for pig-iron is confined mainly to current needs and the maintenance of a working stock. All grades are plentiful and the easy supply position does not warrant forward buying as deliveries can be secured promptly.

The steelworks continue to take up substantial tonnages of pig-iron, but there are tonnages to spare and some furnaces are working below capacity levels. The ironfoundries are also well provided with pig-iron and most producers could step up deliveries if called upon to do so.

Ferro-alloys

Conditions are again quite active, which is rather surprising in view of the uncertainty of trade at the present time. There has been some improvement in the demand for ferro-tungsten and reasonable attention is given to ferro-vanadium and ferro-molybdenum.

There is a good demand for ferro-silicon and both the low and high carbon grades of ferro-chrome. Calcium silicide is in fair request, and moderate support is given to ferro-manganese and silico-manganese.

Interest in ferro-titanium and ferro-niobium is at a good level, but silicon metal is quiet.

Semi-finished Steel

Most of the re-rollers are in need of more work. There is little if any improvement in the demand for small bars, light sections, and strip and even the call for reinforcing rods has fallen away to some extent. Home demand is on a reduced scale and export business is difficult to obtain against the lower prices quoted by makers abroad.

Plentiful supplies of both mild steel and carbon quality semis are available from the home steelworks and, while alloy steels are now a little easier, delivery dates are still extended.

Finished Steel

The fact that many requirements can easily be met from current rollings has reduced demand to a low ebb and forward ordering is almost negligible. There is plenty of room in rolling programmes for additional tonnage in sections, plates, and joists. Makers of small rounds, flats, squares, sheets, and cold and hot rolled strip welcome any new business forthcoming.

A fair demand continues to be maintained for flat and corrugated galvanized sheets for which reasonable delivery dates are obtainable, but slightly extended dates are being quoted for special alloy and high carbon bright steels. Colliery requirements remain well below normal.

Mr. JOHN LESSELLS has retired after 42 years as a joiner at Valleyfield Colliery, Fife.

"Exporters penalized," says Baker Perkins Chief

IT seemed amazing that we had any exports at all, said Mr. F. J. Erroll, Minister of State, Board of Trade, in view of the difficulties which, he was told by some people, were hampering British oversea trade. Nevertheless, he was asking for more. Mr. Erroll was speaking at the opening on Monday of the new headquarters in Park Lane, London, W., of Baker Perkins (Exports), Limited, a subsidiary of Baker Perkins, Limited, manufacturing engineers, iron, steel, and brass founders, of Peterborough (Northants).

Chairman of the company, Mr. Harold Crowther, expressed the hope that the Government would not continue to penalize the home market. There might otherwise, he said, be serious repercussions in the export markets, particularly if research and development lagged behind because of enforced economies which might have to be introduced to counter some of the recent measures taken by the Government. The recent increase in the Bank rate, he believed, penalized exporters. What was necessary was a preferential bank rate for export trade on long-term credit sales.

Development of Use of Coated Titanium Anodes

AGREEMENT to pool appropriate patents and collaborate to develop and extend the use of titanium anodes coated with a thin film of platinum or similar metal has been reached by Imperial Chemical Industries, Limited, Magneto-Chemie, NV, Holland, and the Amalgamated Curaçao Patents Company, of Curaçao.

Coated titanium anodes offer considerable advantages over conventional materials in industrial electrolytic cells for chemical manufacture, electroplating plant, and equipment for converting brine to drinking water. They are also being used for cathodic protection against sea-water corrosion.

The metals division of ICI is marketing platinized titanium anodes which are being manufactured in Britain by its subsidiary, Marston Excelsior, Limited, Wolverhampton.

WHOLE of the technical and commercial assets of the spray dryer business of Luwa, AG, of Zurich, Switzerland, are to be taken over by Steel & Company, Limited, Sunderland. Design, manufacture, and installation of Luwa spray dryers in the UK will be carried out in the near future by Steels Process Plants, Limited, Eastcote, a wholly-owned subsidiary of Steel & Company.

Coalfield News

Mr. Alex Moffat Succeeds His Brother

FOR the past 10 years vice-president of the Scottish Area of the National Union of Mineworkers, Mr. Alex Moffat has been elected to succeed his brother, Mr. Abe Moffat, the retiring president. He will take over on September 24, his brother's 65th birthday. Mr. Alex Moffat, a member of the Communist Party, received nearly 3,000 votes more than his Labour opponent, Mr. Alex Eadie.

The new president, who is 57, started work in the pits when he was 14. He has served on the General Council of the Scottish Trades Union Congress and in 1957-58 was vice-president. Last year he was an unsuccessful candidate for the presidency of the NUM.

AFTER 52 years' service at Broomhill Colliery, near Morpeth (Northumberland), Mr. John Carse has retired at the age of 65. For 25 years he has been a member of the miners' lodge committee.

OPEN-CAST mining sites in Co. Durham, including several sites now being restored, were visited on Monday by Mr. W. M. F. Vane, Parliamentary Secretary to the Ministry of Agriculture.

AREA AGENT of the Derbyshire branch of the National Union of Mineworkers, Mr. Michael Kane retired last Sunday. A presentation was made by Mr. Leslie Ellis, the Nottinghamshire agent, in recognition of his services.

THIRD PIT TO close in the county since 1959, Walkmill Colliery, near Whitehaven (Cumberland), will be shut on November 25 after 71 years' life. The National Coal Board has assured the 185 redundant miners of alternative work.

LACK OF CONTACT between Carcroft (Yorks), miners and the Church is a problem that the Rev. P. M. Dawes, minister of the Presbyterian Church, hopes to remedy by regular visits to Bullcroft Colliery and talking to the men as they work.

SURVEY BEING carried out by the National Coal Board in the Doncaster (Yorks) Rural Council area, is aimed at finding out how many old people living in miners' houses would be willing to move into council-built bungalows to make way for recruits to the industry.

FIRST office block to be specially built at Bagworth Colliery (Leics), at a cost of £11,000, was officially opened last week by the wife of Mr. R. J. W. Agar, the colliery manager. Since the colliery first started production in 1920, the offices have been housed in converted cottages.

OVER 1,200 MEN employed at Arrael Griffin Colliery, Six Bells (Mon), who had been on strike since Wednesday last week, returned to work on Monday. Coal Board officials are to meet miners' leaders to discuss the dispute, which arose from the refusal of some men to move a power-loading machine which was claimed to be unsafe.

OVERALL PRODUCTIVITY in the Durham Division of the NCB during the first 33 weeks of the year averaged 23.05 cwt. per manshift against 21.98 cwt. in the corresponding period of 1960. At the face, productivity reached 65.82 (64.49) cwt. Last week, overall productivity was 22.24 (20.99) cwt. per manshift with 65.07 (61.97) cwt. at the face.

A PAPER on "Methane Drainage and Spontaneous Combustion" will be presented by Mr. W. M. Robertson, Area chief scientist, No. 1 (North Staffs) Area, West Midlands Divisional Coal Board, at the meeting of the North Staffordshire Institute of Mining Engineers at the North Staffs College of Technology, Stoke-on-Trent, at 5.30 p.m. on Monday.

MINEWORKERS at Sneyd Colliery, Burslem (Staffs), are using their spare time repairing radios for old people. The sets have been handed in following an appeal for radios for pensioners. Organizer behind the repair work is Mr. John Marshall, chairman of the North Staffordshire Old People's Welfare Committee, who also works at Sneyd Colliery.

BETTER SAFETY precautions at Morton Colliery, near Derby, were urged by the jury at a Clay Cross inquest on Mr. E. G. Frost (23), a miner who was crushed at the pit by a conveyor which was stated to have been started without warning. The operator of the machinery, Mr. R. Kerry, said he saw no one when he started the belt. Verdict of Accidental Death was returned.

PRODUCTION at Bardon Mill Colliery (Northumberland), has increased by nearly 50 per cent. in two years, and this year's output is expected to exceed 140,000 tons, said Mr. E. W. Potts, Area general manager, at Haltwhistle. He presented long-service certificates to seven men with a combined total of 350 years' service, and cash gifts to 30 men whose total service was nearly 1,500 years.

AS A RESULT of delays in the delivery of new equipment for installation at Shirebrook Colliery, near Mansfield (Notts), where a £4,000,000 modernization scheme is in progress, more than 300 underground workers at the colliery have been temporarily transferred to Welbeck and Warsop Main Collieries. Special buses are being provided to take the men and bring them back after each shift.

FOR HIS REMARKABLE service to the mines, Mr. Frederick Long (66), who retired last year after 50 years as lampman at Six Bells Colliery (Mon), Cwmtillery Colliery, and North Celynen Colliery, during which time he never missed a shift, has been presented with a replica of an early oil lamp by Mr. Lister Walker, general manager of the No. 6 (Monmouthshire) Area, South-Western Divisional Coal Board.

MINERS' union contributions may have to be increased, it was stated at a meeting of the Council of the Durham Area of the National Union of Mineworkers last Saturday. Mr. Sam Watson, secretary, said a resolution calling for better benefits, based on higher contributions, had been referred to the National Executive Committee. Fewer miners in Co. Durham meant reduced income from contributions, he said, although expenditure had risen in all directions.

NUM Delegates Reinstate Yorkshire Miner

DELEGATES from the 104 pits in the Yorkshire coalfield on Monday reversed the decision of their executive committee to expel Mr. Robert Wilkinson, a communist former branch official of the NUM, for his part in the Yorkshire coalfield strike in February. The strike caused the loss of 800,000 tons of coal and made 67 pits idle.

Mr. Wilkinson (33), a coalface worker at Water Haigh colliery, Leeds, appealed against the expulsion. The council of delegates decided by 56 votes to 48 to reinstate him. Mr. F. Collindridge, secretary of the Yorkshire Area of the NUM, said that the meeting felt that Mr. Wilkinson should have been dealt with in the same way as the three other officials who were reprimanded for their parts in the strike.

THE COAL TRADE

DEMAND for household fuels, which has at no time fallen away so severely as in previous years, is now showing signs of perking up even more. In the light of the weather of the past week, the call would seem to be for stocking. This is borne out by the need for the better qualities, but it is in this bracket that shortages and delivery dates are reported from a number of areas. Merchants' greatest concern, however, is with the persistent and frustrating shortage of the better varieties of anthracite. Excuses and apologies for delays of several weeks do not help in getting and keeping the general public "solid fuel conscious."

SCOTLAND

Glasgow.—The effect of continued poor weather is still being felt in the domestic trade, and merchants are pressing more strongly for supplies. Many express dissatisfaction with the scale of deliveries, but generally, contract tonnages are being honoured almost in full. What is wanted by the trade is additional tonnage. Disposals at retail level have been much higher than a year ago on account of the weather and depot stock is not up to strength. It is this deficit which merchants are endeavouring to overcome.

Current production has not completely recovered from the holiday interruptions and all available supplies of round coal are required to meet allocations. Substantial quantities of doubles are on hand, but merchants are very loath to accept any of this grade in replacement of large coal. A larger tonnage of doubles than last year is however being taken up due to the general expansion in the demand.

In the industrial sector the situation is easier. Electricity smalls are readily available to meet the increased stock programme at the power stations, and general industrial sorts are also adequate. There is no sign of any problem with railway or gasworks fuel. Bituminous duff is clearing promptly, with no really large quantities to cause any concern to distributors. There is a great deal of anxiety, however, with regard to coking smalls. Consumption is down by 50 per cent. from a year ago and corresponding tonnages are being laid down at the collieries. Metallurgical coke is sufficient to meet requirements. Demand for anthracite stove nuts is increasing, but supplies keep barely steady. Large anthracite is moderately comfortable, while any surplus duff continues to clear to the near Continent.

Fife and Lothians.—Neither zone is able to meet demands for larger tonnages of round coal for the domestic trade, and surplus doubles are not being accepted readily as an alternative. The industrial market is comfortable, but exports are falling in the absence of prices to compete with Polish coal.

NORTH WALES

Receipts of house coal following resumption of working at collieries have been poor, and many merchants have been forced to lift what little ground stocks they had. Other traders are waiting on day-to-day arrivals. Order-lists are heavy, and considerable anxiety is felt over the forward position.

There is no improvement in the anthracite position, and delays of up to four months for the better grades have to be endured. Phurnacite is also subject to considerable delay, and receipts of Coalite do not match requirements. Abundant supplies of Sunbrite coke, and gas coke are readily to hand. No difficulty is reported for supplies of steam-raising fuel.

Wm. Cory Warning on Decline of Seaborne Coal Trade

COAL and oil contracting group, Wm. Cory & Son, Limited, may withdraw from the seaborne coal trade if conditions decline further, warns Mr. F. A. Leathers, chairman, in his annual report. The decline in the seaborne trade, he says, is reflected in the reduction of the group's collier fleet to 17, brought about primarily by competition from fuel oil and also by the discriminatory increase in railway rates between collieries and ports of shipment.

A serious situation could arise, he adds, if the tonnage of seaborne coal should be reduced beyond the point at which the trade is economical, because of the dependence of London and the southern part of the country on coal carried by this route. Should the Coal Board allow a further decline by reason of uncertainty of supplies and too high a price, the group would reluctantly be forced to withdraw from this old-established section of the business.

Mr. Leathers says that bearing in mind the very difficult trading conditions, results for the year to March 31, 1961, were not unsatisfactory mainly because of the diversity of activities. The coal side of the business overall had improved, though this was due to greater efficiency and not increased turnover in sales. Group trading profit rose to £2,722,945 (£2,294,132), and net balance attributable to the group was £1,072,923 (£911,807).

Labour Shortage Delaying Work on New Coal Faces

DEVELOPMENT of new coalfaces is being held up by the labour shortage in the mines, said Mr. J. Tighe, president of the Nottinghamshire Area Council of the National Union of Mineworkers, at Mansfield on Monday. Mr. Tighe told Council members: "The industry is losing men hand over fist because of the very low wages paid to day men. The top rate is only 39s. 3d. a day, and some of the wages are much lower than that. In my opinion, a fully qualified man should be paid not less than 50s."

Mr. Tighe said that manpower in the industry had dropped by 117,000 in three years, and unless they could attract more recruits the mines would be in serious difficulty. Men were having to be taken off productive work to do day work, and this was not only affecting the development of new coal faces, but retarding production on existing ones. He mentioned one area—with 13 collieries—in the county where 400 qualified coalface workers could be found jobs immediately provided the day-wage men were there.

Appointments

Executive Changes at Stewarts and Lloyds

GENERAL manager of the Combs Wood, Halesowen (Worcs), tube works of Stewarts and Lloyds, Limited, Mr. C. B. McNAIR retired yesterday (Thursday) because of ill-health. He is succeeded by Mr. W. H. CRAWFORD, general manager of the company's tube works at Corby (Northants).

From today Mr. Crawford will be in charge of both works. Mr. E. J. WHITFIELD, works manager at Coombs Wood, will become assistant general manager.

General enginers and ironfounders, of Abergavenny (Mon), Davies & Company, Limited, has appointed Mr. W. H. BOWEN manager of its Lion works.

Mr. PETER GOMM has been appointed to the newly created post of manager, public relations, by Goodyear Tyre & Rubber Company (Great Britain), Limited.

Mr. M. L. WHEELER, assistant home sales manager of Firth Cleveland Tools, Limited, London, has been appointed sales office manager of the Tipton (Staffs), works of the company.

Mr. K. S. BRADSHAW, Birmingham branch manager of Cox & Danks, Limited, a company in the Metal Industries, Limited, group, has been appointed Midlands director of Cox & Danks, based in Birmingham.

British Railways has appointed Mr. L. C. BALLARD assistant to the district goods superintendent, West Riding district, Leeds (responsible for coal class traffic) in succession to Mr. W. A. Langton, who has retired.

Mr. G. B. JONES has been appointed divisional transport officer for the West Midlands Divisional Coal Board with effect from October 2. He has held posts in transport management in private industry in the Midlands and South-West, and is an associate member of the Industrial Transport Association.

Mr. H. WILSON, previously assistant sales manager, has been appointed home sales manager of J. C. Bamford (Excavators), Limited. Mr. J. G. LORINSON has been appointed manager of Rocester Services, Limited, service company for J. C. Bamford (Excavators). He was previously assistant area manager with a Newcastle company.

Mr. A. C. EHRENBERG has been appointed manager and chief engineer of the Switchgear Testing Company, Limited, a subsidiary of Associated Electrical Industries, Limited, and Mr. A. V. SYKES becomes secretary of the company. The changes follow the retirement of Mr. V. A. BROWN as manager and secretary. Mr. Sykes retains his duties as chief clerk, secretary's department, AEI (Manchester).

Mr. J. A. DUNBAR has been appointed manager for Scotland for the Aberdare Cables, Limited, group. He will control sales promotion and will also operate the Glasgow factory of South Wales Switchgear, Limited. Mr. Dunbar was formerly senior sales engineer for the instrumentation division of Associated Electrical Industries, Limited, and previously superintendent of the AEI meter department, London.

Mr. GRAHAM W. ALMROTT, for the past five years manager of the Desford (Leics) works of Caterpillar Tractor Company, Limited, Glasgow, of which he has been a director since 1958, has been appointed manager of the plant at Birtley (Co. Durham). He moves there on October 1 and will take full responsibility on January 1. His successor at Desford is Mr. T. V. J. ARMSTRONG, formerly parts department manager.

Making Coke from Nigerian Coal

FIRST step forward in establishing in Nigeria a steel industry based on indigenous coal was taken on Tuesday, when representatives of the Nigerian Coal Corporation, headed by the chairman, Mr. C. C. E. Onoh, witnessed a demonstration at the coking plant of the Shelton Iron & Steel Company, Limited, at Stoke-on-Trent, of a new process specially developed by Simon-Carves, Limited, to produce a metallurgical fuel from non-coking Nigerian coal. On Wednesday a visit was paid to the Simon-Carves laboratories at Cheadle Heath, Stockport.

It is proposed to build a steelworks in Nigeria estimated to cost some £35,000,000. The object of the delegation's visit was to witness tests carried out by Simon-Carves on the coking of coal from Enugu, which is of a non-coking type.

Coal Board Official for UN Post

MANAGER of the National Coal Board training centre at Grassmoor, Chesterfield, for the past four years, Mr. A. S. Danchev is to leave his post to work for the United Nations, and is expected to be abroad for about a year. After training in Geneva and Istanbul, Mr. Danchev will work in Cairo on the establishment of a vocational training institute for the Arab Republic with the Egyptian Director General of the Productivity and Training Department in the Ministry of Industries. He will also assist in the technical training of Egyptian staff for Government posts in the United Arab Republic.

Mr. Danchev, who worked at the NCB headquarters in London before moving to Grassmoor, obtained his B.Sc. (Mining Engineering) at Leeds University. He is an associate of the Institute of Mining Engineers and an associate of the British Institute of Management.

South Wales Coke for Pakistan

FIRST business done with Pakistan for a long time, a cargo of 7,000 tons of coke left Cardiff on Thursday of last week for Karachi, and it is hoped that further orders will follow. Moxey, Savon & Company, Limited, coal exporters, of London, E.C.3, who gained the order, were successful earlier in the year in opening up business with Japan. Buyers in this market purchased about 30,000 tons of coke breeze for use in steelworks.

There has recently been more business for Welsh coal, chiefly anthracite, from West Italy. These customers in the past were extensive users of Welsh coal and earlier this year placed some sizeable contracts.

BECAUSE OF THE increasing demand for its products, the Motherwell firm of mining machinery and equipment manufacturers, Anderson, Boyes & Company, Limited, is to have a 35,000-sq. ft. extension to its factory at Glenrothes (Fife). The present factory occupies 65,000 sq. ft. and the extension, which is expected to take seven months to build, may result in a rise in the labour force to 500. Work on the extension is to start immediately.

Company News

Fight for Exports

MR. JOHN OLDHAM FORESEES MORE SEVERE STRUGGLE

AGAINST a background of intense and increasing competition from oversea, as well as the development of local manufacture, direct exports of Oldham & Sons, Limited, battery and miners' safety equipment manufacturers, etc., of Denton (Lancs), now absorb about 25 per cent. of the company's production, says Mr. John Oldham, chairman, in his annual statement. He warns, however, that the fight to maintain the present export level, let alone increase it, is going to be much more severe. He believes that increasing diversification of the company's production will broaden the base of sales in the export field.

After reporting encouraging progress over the whole range of the company's oversea subsidiaries during 1960-61, Mr. Oldham says that the present time is probably the most difficult in which to make predictions about the future, but from the continued progress made he has "measured confidence" in the company's ability to meet the challenge of the future.

Situated as it is in the centre of the Common Market, plans are now moving forward for the French subsidiary to take advantage of the opportunity offered by this vast new market. Mr. Oldham adds that no one can fail to be impressed by the resurgence of French industrial and commercial activity and the challenge and opportunities which present themselves.

Mining "A Very Important Market"

The chairman says that there has been a large measure of reorganization and re-equipment in the company, and although not yet completed these developments will prove of long-term benefit. The mining industry, he points out, remains a "very important market" in its potential demand for the company's diversified range of products, and in the last few years other items have been added, including power supply equipment for shaft signalling and emergency uses and, latterly, Pg batteries for underground locomotives.

On the mine lighting side results have been satisfactory, and in the new line of Pg batteries, an increasing share of the demand has been secured. Further improvements have been incorporated into this range which have resulted in greater safety and operating efficiency.

A new division has been created to provide batteries and associated services for Britain's growing mechanical handling industry, and substantial progress is being made in this new market with batteries designed for road vehicles, underground locomotives, and mechanical handling equipment.

Mr. Oldham's statement, which is circulated in French as well as English, is accompanied by a brochure entitled The Oldham Group in the 'Sixties, describing how the group has expanded in 15 years.

WOLSELEY-HUGHES, LIMITED, holding company for engineering concerns, of Birmingham—Permission is being sought for London and Birmingham Stock Exchange quotations for the 150,000 6 per cent. preference £1 shares.

NEWMAN, HENDER & COMPANY, LIMITED, manufacturers of bronze, iron, and steel valves, etc., of Stroud (Glos)—Except for those companies dealing with the petroleum industry, all the companies of the group have full order-books and overall output and sales are on the increase, states the chairman, Mr. N. P. Newman.

ARTHUR BALFOUR & COMPANY, LIMITED—Interim dividend of 6 per cent. less income tax has been declared on the 2,091,964 ordinary shares of 10s., payable to holders registered on August 10, in accordance with the terms of the offer by Balfour & Darwins, Limited, dated July 14, 1961, and now unconditional.

KANGO ELECTRIC HAMMERS, LIMITED—Sales for the first six months of 1961 were nearly 20 per cent. above those for the corresponding period of 1960, and nearly 12 per cent. over the high level achieved in the last half of 1960, state the directors. The interim dividend is maintained at 7½ per cent. Last year's final was 12½ per cent.

GEORGE H. SCHOLES & COMPANY, LIMITED, electrical engineers, of Wythenshawe, Manchester—Net profit for the year to June 30, 1961, was £215,000, compared with £202,000, after tax of £234,000 (£190,000). A final dividend of 22½ per cent. makes an unchanged total for the year of 27½ per cent. It is proposed to make a scrip issue of one for five.

FURNESS, WITHY & COMPANY, LIMITED, shipowners, etc., of Newcastle-upon-Tyne—Group profit on ships' trading and other business, after contingencies, and, in the case of a subsidiary, special depreciation on new tonnage, was £4,400,000 (£4,700,000). Depreciation took £3,600,000 (£3,200,000) and with the maintained 10 per cent. dividend, the group net profit was £1,300,000 (£1,800,000).

WILMER LEA FOUNDRIES (HOLDINGS), LIMITED—At Monday's extraordinary meeting holders approved the acquisition of Charles Karen & Son (Holdings), Limited, group, and John Batt & Company (London), Limited, together with eight non-trading companies, consolidating the 1s. shares into 5s. shares increasing the capital to £500,000, amending the articles and changing the name of the company to C.K.S. Group United Metals, Limited.

HACKBRIDGE HOLDINGS, LIMITED, manufacturers of electric cable, transformers, mining equipment, etc., of Hackbridge (Surrey)—Companies within the group, in common with other organizations in the electrical industry, traded under increasingly difficult circum-

stances during the past financial year. The volume of output was well maintained and under such competitive conditions the results "are not unreasonable." The group has an extensive order-book.

BROKEN HILL PROPRIETARY COMPANY, LIMITED, iron and steel manufacturers, of Melbourne, Australia—Profits in the year ended May 31, 1961, increased by £A1,464,062, about 11 per cent., to £A14,763,390. Mr. C. Y. Syme, the chairman, said that present output was above local requirements and the company was pursuing export sales. Demand in the home market has declined in recent months, he added, but sufficient orders have been obtained to maintain full production.

BRAITHWAITE & COMPANY, ENGINEERS, LIMITED, constructional engineers, of London, S.W.1—The structural order-book is now in a much healthier condition and while prices remain very keen a period of full production can be looked forward to at the West Bromwich and Newport works, says Mr. J. Harvey Humphreys, chairman. The board now feels that the tide has turned and that a steady improvement can confidently be expected. In the year ended March 31, 1961, the group incurred a net loss of £37,710, compared with a previous profit of £45,706.

DRAKES, LIMITED, ironfounders and constructional engineers, of Halifax (Yorks)—Reporting a loss of £20,262 for the year to December 31, 1960, Mr. John A. Drake, the chairman, says that the company has received no large contracts from the gas industry and it has been pursuing its policy of diversification. Loss is attributable to development charges for new types of plant and by contracts proving unremunerative, as, until diversification is complete, the works have not been fully employed. The directors do not recommend the payment of an ordinary dividend.

Powell Duffryn May Expand Coal Trade Interests

STATING that with such widespread activities it was somewhat unusual to report that "everything had gone right" in the financial year 1960/61, Sir Henry Wilson Smith, chairman of the Powell Duffryn, Limited, group, says in his annual report that more than half of the increase in trading profits could be ascribed to the first contributions made by new acquisitions. In recent years, the group had also drawn substantial income from short-term investment of liquid resources. While every year could not be expected to be as successful as the last, the general outlook for the group remained satisfactory.

Coal continued to be a most important side of the group's business, and the higher consumption in the UK and increase in exports was reflected in the trade of the companies engaged in the distribution of coal. Possible developments were being considered to expand the group's interests in the UK coal trade, and further investment had been made in this direction, particularly in Associated Coal & Wharf Companies, Limited, designed to maintain the standard of coal installations and improve coal preparation equipment.

On the engineering side, says the chairman, Powell Duffryn Engineering Company, Limited, is still facing the problems arising from the drastic cut-back in British Transport Commission orders for railway wagons which in the past constituted about half of the company's turnover. New lines of activity were therefore being developed such as oil storage tank fabrication, the manufacture of mobile material handling equipment, and general engineering work.

End of Drain on Coal's Manpower?

COAL production is now almost back to normal and at 3,469,100 tons is on a par with the output for the corresponding period last year. In the week ended August 19 a drop of only 30 is recorded in the number of colliery workers—the lowest for many months—and although there were 60 fewer face workers, it could be a sign of a turning point in the industry's manpower problem.

Undistributed coal stocks continue to dwindle and enlarge the gap between the figures for 1961 and 1960—now over 12,000,000 tons. A halt in the building up of consumers' stocks was called in the week ended August 19, when they dropped back by 130,000 tons to 15,697,000 tons—the amount by which consumption exceeded production for that week.

There were 564,510 wage-earners on colliery books on August 19, against 592,130 on August 20, 1960, the numbers engaged at the coal face being 211,990 and 225,380 respectively. Total absenteeism (all workers) in the week ended August 19 was 15.21 per cent., compared with 14.79 per cent. in the week ended August 20, 1960. Output at the face was 3.896 tons and overall 1.341 tons in the week ended August 19, compared with 3.870 and 1.365 tons in the week ended August 20, 1960.

The following table gives (in tons) the provisional figures of output of saleable mined coal by division in the week ended August 26, and the tonnage lost through disputes:—

Division.	Week ended August 26, 1961.		Week ended August 27, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish ..	346,000	8,000	346,000
Northern (N&C) ..	224,000	—	242,000
Durham ..	323,000	127,000	335,000
North-Eastern ..	696,000	130,000	683,000
North-Western ..	235,000	—	256,000
East Midlands ..	792,000	98,000	787,000
West Midlands ..	256,000	1,000	274,000
South-Western ..	349,000	11,000	371,000
South-Eastern ..	30,000	—	28,000
Great Britain—			
Deep-mined coal ..	3,251,000	375,000	3,322,000
Open-cast coal ..	176,000	—	138,000
Other deep-mined (including licensed mines) ..	42,000	—	43,000
TOTAL ..	3,469,000	375,000	3,503,000

MINING NEEDS BRAINS MORE THAN BRAWN

MINING today depended much more on electricity than muscle, trainees at the residential training centre at Sauchie were told recently at the completion of their preliminary training period. Speaking to the students, Mr. J. Sneddon, technical manager of the Muircockhall Training Centre, Dunfermline, said that mining required tough men, but, above all, men with brains to deal with the large amount of machinery which was going into the industry.

The dangers of mining, he went on, were becoming less than ever before, and there was no doubt that a trained person was far superior to one who had received no training. Their motto must be "Safety Always."

NEWS IN BRIEF

E. BOYDELL & COMPANY, LIMITED, manufacturers of the Muir-Hill range of dumpers, loaders, and shunters, of Manchester, has appointed H. W. Lees & Son, Foxrock, Co. Dublin, as its sole distributors in Eire.

PRESENTATIONS HAVE been made by Mr. Oliver Holmes, managing director of Prince-Smith & Stells, Limited, manufacturers of textile machinery, of Keighley (Yorks), to five of the company's employees who each have at least 50 years' service.

COAL AND COKE shipments from the Hartlepools during the 32 weeks ended August 14 amounted to 931,244 tons compared with 901,002 tons last year. Imports of iron ore, during the same period, were 523,226 tons, compared with 447,278 tons.

MAKERS of industrial and commercial lighting fittings, Benjamin Electric, Limited, London, N.17, is to open a Scottish office at 259, St. Vincent Street, Glasgow, on Tuesday, under Mr. J. M. Anderson, area manager for Scotland and Northern Ireland.

LARGEST IRON ORE CARGO ever dealt with by Cardiff docks was unloaded this week at the modern ore discharging berth of G.K.N. Steel Company, Limited. The cargo, 19,500 tons, came from Seven Islands, Labrador. Previous biggest single delivery was 18,000 tons.

THE PLESSEY COMPANY, LIMITED, has concluded negotiations to lease from the Swindon Corporation a further 50,000 sq. ft. factory at Cheney Manor, Swindon. The factory is expected to be used for expansion of the company's industrial hydraulics division.

ACTUAL PRODUCTION of raw steel in the US during the week ended August 28 totalled 2,020,000 tons. This was a 3.9 per cent. increase compared with the 1,944,000 tons in the preceding week. Actual raw steel production in the US in the current year to date totals 60,110,000 (72,302,000) tons.

FEES FOR FILING a patent application are to be increased from £4 to £10 after October 1. The new rules also reduce from three and a half to three years the period allowed to an applicant for putting an application in order for acceptance. This comes into effect after January 1 next year.

NEWPORT (Mon), engineering firm, A. J. Seward, Limited, has been appointed sole agents in South and West Wales for the American Shear Knife Company (Asko). In addition to handling sales of Asko blades, Seward will also undertake the re-grinding of the equipment after its use in cutting all thicknesses of metal, including heavy slab, heavy plate, and tinplate.

PRODUCTIVITY team on welding from the National Productivity Council of India visited the UK last week at the invitation of the Institute of Welding. The party, led by Mr. R. Ghosh, technical sales manager of Indian Oxygen, Limited, visited leading engineering, shipbuilding, and other works, as well as the British Welding Research Association's research station at Abingdon.

PRIVATE EXHIBITION of Nife portable safety lamps will be held at the Park Hotel, Cardiff, from November 20 to 23. A comprehensive range of lamps made by Nife Batteries, Limited, Redditch (Worcs), will be on view, including safety lamps, industrial inspection lamps, floodlight sets, high power searchlights, and marine lamps, together with a selection of charging equipments.

VISCO ENGINEERING COMPANY, LIMITED, has changed its name to Visco, Limited. The company which has been supplying, for the past 40 years, air filtration, fume removal, dust collection, water cooling, and ventilating equipment to industry, will continue manufacturing these and other specialized equipment at its factories in Croydon (Surrey), and Bromborough (Ches).

ENGINEERING works of G. C. Ogle & Sons, Limited, agricultural engineers and ironfounders, of Ripley (Derbyshire), has been closed. About 18 months ago the company closed its foundry when it became uneconomic to do its own casting work. The business has been in existence for some 60 years, and it is proposed to carry on the retail side at premises in Ripley as before.

STOCKHOLDING service of Crofts (Engineers), Limited, power transmission engineers, of Bradford, has been extended to its London branch at 36/42, Tanner Street, Bermondsey, London, S.E.1 (telephone: HOP 7751/4), which also has a new showroom. The firm's technical and estimating service is being further augmented at the new offices under the management of the London director, Mr. H. W. Cameron.

EXCLUSIVE licence agreement has been concluded by Vokes, Limited, scientific filtration specialists, of Guildford (Surrey), with the Chain Belt Company of Milwaukee, US, to manufacture the complete range of Rex process equipment in Great Britain and certain European territories. The Rex range includes mechanically cleaned bar screens, grit collectors and washers, sludge collectors, and skimming pipes.

NEW FACTORY in Huntingdon is being built by Victaulic Company, Limited, makers of pipe joints and fittings, of London, E.C.4, which is controlled by Stewarts and Lloyds, Limited. One section of the plant, to be ready in October, will produce rubber gaskets for iron, steel, and concrete pipes. A second section, expected to be ready by March, 1962, will make plastic pipes for Stewarts and Lloyds.

TO SPEED-UP delivery times and to provide an "on-the-spot" service for customers in Germany, BTR Industries, Limited, has, in anticipation of Britain's entry into the Common Market, formed a wholly-owned subsidiary in Cologne—BTR Industries, GmbH. The new company will, at the outset, manufacture Hi-Flex hydraulic hose assemblies to meet British, American, German, and French standards and sizes.

OBJECTING TO the further extraction of coal from the open-cast site on the Earl Fitzwilliam estate at Wentworth (Yorks), a recommendation by its Town Planning Committee has been approved by the Rotherham Rural Council. The Sheffield region of the Open-cast Executive had asked for the Council's approval for the extraction of coal from additional areas at Wentworth which have been used for the stacking of soil and overburden.

AS THE RESULT of discussions between the British Manufactured Bearings Company, Limited, Crawley (Sussex), and the General Bearing Company, of New York, a five-year reciprocal agreement has been signed. General Bearings will sell BMB bearings and ballraces throughout the US and BMB (Sales) will have the sole selling agency for the comprehensive range of turned commercial bearings manufactured by the US company. Mr. G. T. P. Gardner, BMB's sales director, is to visit the US in connection with sales promotion and marketing problems.

New Firm Will Lease Capital Equipment

LEASING of capital equipment and vehicles to British industry and commercial undertakings is to be carried out by the Equipment Leasing Company, Limited (ELCO), a new company which has been formed by Hambros Bank, Limited, Phoenix Assurance Company, Limited, and Cable & Wireless (Holding), Limited, together with Lease Plan International Corporation, of New York.

The idea, not entirely new in Britain, is to be carried out on a large scale by ELCO, concentrating on finance leasing initially, with a probable extension of activities later. Advantages of the scheme, put forward by the combine, are, principally, that it leaves a firm's working capital free for other and more profitable uses, and freer working capital means a larger borrowing capacity. Leasing also gives tax relief on the whole of the rentals instead of on capital allowances only and it protects the balance sheet position, because no entry is required. It enables an industry not only to be equipped with the most modern machinery, but periodically to be re-equipped and so be free from the dangers of obsolescence; it avoids heavy maintenance costs on old equipment and it facilitates the execution of a major contract requiring specialized machinery for a definite period.

In American experience the most usual items for leasing are machine tools and other types of factory equipment, electronic equipment, fleets of cars, vans, and lorries, office machines, storage tanks, containers, and chemical process equipment.

The new company starts operating on October 1 and the chairman, Mr. H. L. Meckler, president of Lease Plan International, said it was prepared to spend several million pounds during the first year of operations. At least 50 per cent. of ELCO's shareholding will be held by UK interests and 25 per cent. or less by the US company. It is expected by British interests in ELCO that the scheme will be of particular advantage to smaller and medium-sized manufacturers and firms in helping to meet capital equipment requirements.

Crompton Parkinson Leaves Atomic Power Group

MANAGING director of Crompton Parkinson, Limited, manufacturing electrical engineers, of London, W.C.2, Mr. J. V. Daniel has resigned from the board of Atomic Power Constructions, Limited. This follows the recent withdrawal of Crompton Parkinson from the Atomic Power Constructions consortium. Last year APC joined forces with the General Electric Company, Limited-Simon-Carves, Limited, Atomic Energy Group to design and build nuclear power stations in the UK and a new company was set up under the name of United Power Company, Limited.

Other companies in the Atomic Power Construction group are Fairey Aviation Company, Limited, International Combustion, Limited, Richardsons, Westgarth & Company, Limited. It is also associated with Trollope & Colls, Limited, and Holland & Hannen & Cubitts, Limited. The GEC-Simon-Carves group is associated with Motherwell Bridge & Engineering Company, Limited, and John Mowlem & Company, Limited.

BSA Tools Group is Formed

NEW holding company, B.S.A. Tools Group, Limited, has been formed for the 10 companies which comprise the BSA tools division. All are subsidiaries of the Birmingham Small Arms Company, Limited, and form part of the BSA group. The object is to ease administration because of the division's widening activities and expanding business.

The board of B.S.A. Tools Group will be:—Mr. Eric Turner (chairman), Mr. C. H. Angell (finance director), Mr. E. W. Hunnisette (Churchill Machine Tool Company, Limited), Mr. W. H. Pearse (technical director), Mr. S. A. Roberts (managing director), Mr. H. C. W. Trapmore (production director), Mr. T. N. Woof (sales director); secretary: Mr. M. Dunstan-Smith.

Mr. Roberts will be chairman and managing director of the following subsidiaries:—B.S.A. Tools, Limited; Burton Griffiths & Company, Limited; B.S.A. Small Tools, Limited; B.S.A. Broach Company, Limited; B.G. Machinery, Limited; B.S.A. Electrics, Limited; Precision Alloy Castings (Birmingham), Limited; Automation Jigs & Tools, Limited.

Mr. Eric Turner, chairman of the parent Birmingham Small Arms Company, will be a member of each of these boards and chairman of the Churchill Machine Tool Company, of which Mr. Roberts will be deputy chairman. Mr. Turner will be president of B.S.A. Tools (Canada), Limited, and Mr. Roberts vice-president.

Hungarian Investment in Metal Working

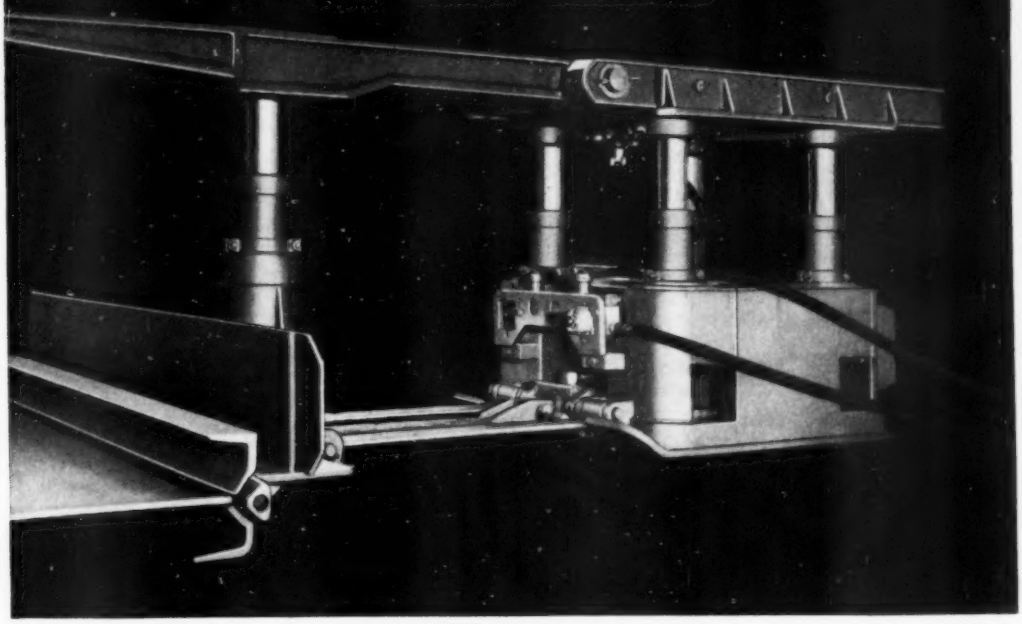
DETAILS of big investments in the foundry and machine industries in Hungary have been announced by Mr. Géza Gazda, head of the development department of the ministry covering such industries. He said that work on the 330,000-ton annual capacity cold rolling mills at the Danube steel complex at Sztálinváros is "going on at full speed" and should be completed by 1962. The hot rolling mill was completed last year.

"Nearly 500,000,000 forints (£15,000,000) is being spent this year on the development of the Danube steel complex," he said, and added, "Our second greatest programme is the reconstruction of the old Ozd steelworks where we are spending 400,000,000 forints on development and rebuilding of the foundry. Completion of the programme should raise production by 150,000 tons a year. The new oxygen factory there will have an output of 12,000,000 cu. m."

Hungary was spending 720,000,000 forints on expansion of its ball-bearing plant at Debrecen, making it one of its greatest industrial combines. He went on to state that 1,080,000,000 forints was being spent this year on improved mechanization and the introduction of new types of automatic machines in Hungarian industry.

STRIKERS AT the Corby (Northants), steelworks of Stewarts and Lloyds, Limited, who claimed that the promotion of one of their fellow workers to an £18-a-week job should have been arranged with the knowledge of their union, are now back at work and the man has lost his promotion. The four-day strike affected 340 workers.

THE GULLICK "SEAMAN" POWER ADVANCED SUPPORT for Low Seams



the 5-leg Chock developed from experience has 5 strong points

1. **Strong Waste Edge Support** to give good caving; maintains two rows of support between the Waste Edge and the Operator, and prevents waste flushing.
2. **Front leg, designed to be as close to the face as possible** and providing the forward support required, yet causing the least hindrance to the power loader operator.
3. **Maximum travelling track** provided by good design of roof bar, and Ram arrangement. With this Chock travelling is as good as conventional faces using props and link bars.
4. **Hinged roof bar and three rows of props** in the chock ensure the maximum distribution of load to the roof, throughout the whole width of the face.
5. **Safe hydraulic fluid** (water/soluble oil) together with the other features combine to ensure good roof control and the safest power advanced support yet devised.

GULLICK LIMITED · KIRKLESS STREET · WIGAN Telephone **WIGAN 46225 (3 lines)**

Obituary

PROF. M. W. TRAVERS

DISTINGUISHED chemist, Professor Morris William Travers, who was vice-president and Melchett medallist, Institute of Fuel, in 1930, died last Friday at the age of 89. The oldest member by election of the Royal Society, which he joined in 1904, he was the co-discoverer with Sir William Ramsay of the inert elementary gases, neon, krypton, and xenon.

Educated at Blundell's School, Tiverton, University College, London, and the University of Nancy, he was appointed assistant professor of chemistry at his old college in 1898 and six years later was given the chair of physics at University College, Bristol. He was honorary professor, Fellow, and Nash Lecturer in the university from 1927 to 1937, and was later made Professor Emeritus.

From 1906 to 1914, Prof. Travers was director of the Indian Institute of Science, and from 1914 to 1919 scientific director of Duroglass, Limited. He became president of the Society of Glass Technology in 1922 and later an honorary Fellow. Vice-president and Melchett medallist, Institute of Fuel, in 1930, he was made an honorary member three years later. In 1936 he was president of the Faraday Society and from 1929 to 1932 a member of the Fuel Research Board. In the second world war he served as a technical consultant at the Ministry of Supply.

MR. R. M. CHALMERS

THE death has occurred at Arnside, Carnforth (Lancs), where he had lived since his retirement about four years ago, of Mr. ROBERT M. CHALMERS, a former head of the mining and geology department at the Wigan and District Mining and Technical College. A native of Scotland, he was a mining lecturer at the Wigan College for over 30 years and head of the department for 10 years.

During the first world war he held a commission in the Royal Engineers and in the 1939-45 war he was commanding officer of the Wigan Battalion of the Home Guard. Mr. Chalmers was a member of The Institution of Mining Engineers and a former honorary secretary of the Manchester Geological and Mining Society.

The death has occurred, at the age of 55, of Mr. ALEXANDER WALLACE, secretary and a director of Furness, Withy & Company, Limited, shipowners, etc., of Newcastle-upon-Tyne.

The death occurred suddenly last Sunday of Mr. JOHN H. HILL who worked for many years at the Edinburgh branch of John Glendenning & Sons, Limited, metal merchants, of Glasgow. He was 51. Mr. Hill recently set up as a manufacturer's agent.

The death has occurred of Mr. HADLEIGH SEABORNE, a well-known figure in the quarrying industry. He was 64. After managing oilfields in Mexico, he returned to North Wales in 1923 where he carried on civil and mining engineering. He was a founder member and the first general secretary (1946-1957) of the Institution of Plant Engineers.

Effect of Fuel Oil Tax on Walter Somers

COSTS still continue to rise and this state of affairs has been aggravated by the recent Budget, states Mr. F. J. Somers, chairman of Walter Somers, Limited, forgemasters, engineers, and manufacturers of die blocks, of Halesowen, in his annual report. Acting on encouragement from the Government the company decided some years ago to convert reheating furnaces from solid fuel to oil. This conversion had been completed and it was most unfortunate that a tax on fuel oil would now cost the company £17,000 in a full year.

The 3,000-ton forging press was now completed and forging times on many types of forgings had been reduced by a large margin. Making of most of the parts of the press, which was of unique design and the largest of its type in the world, and its erection, was undertaken entirely by the company's own engineering staff.

The group profit, before taxation, of £146,077, although lower than that of last year, was satisfactory for what had been a difficult year.

Survey Reveals Exporters Need More Help

MORE help is the prime need of a majority of exporters. This was revealed by the initial results of a postal survey among business readers of the London School of Marketing's "Export Guide." Additional information on selling abroad was needed by 60 per cent. of those who replied, a proportion which applied to both small and large companies.

The sparing use of market research techniques and agencies was a striking feature of the habits of businessmen, adds the survey. Less than one fifth of companies had employed them and the majority of those seemed dissatisfied with the service they received.

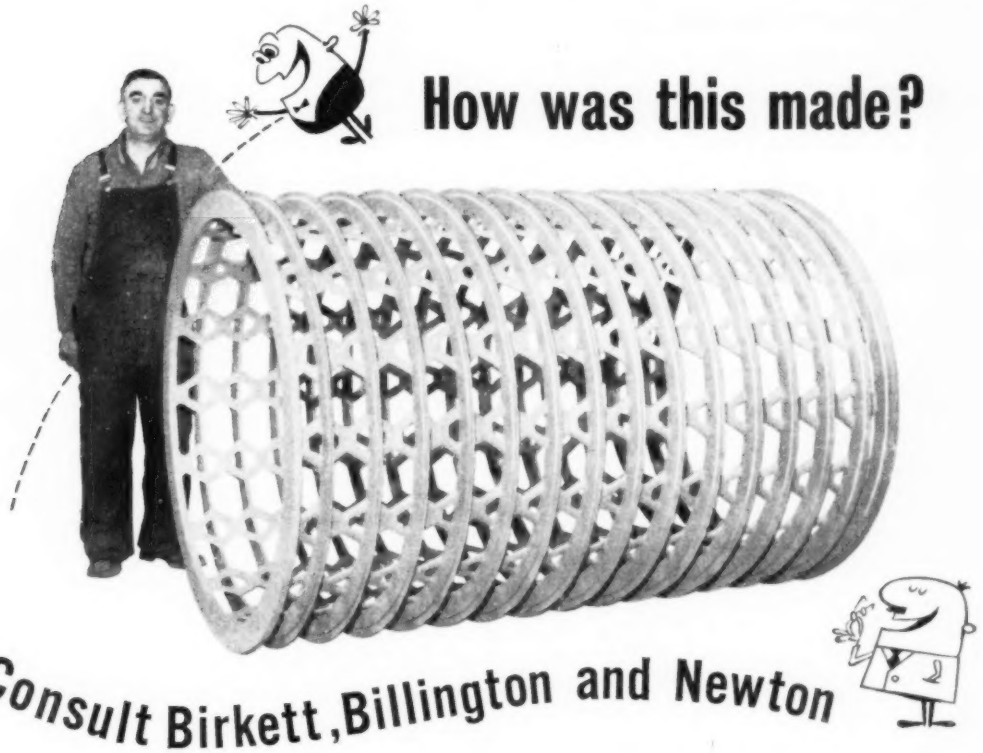
The type of industry did not greatly affect the general pattern of replies, but the size of company made a considerable difference both to the use and opinions of export services. Trade associations and banks were less highly rated by small companies while the Exports Credits Guarantee Department obtained the lowest rating from the very large companies. The Board of Trade was most appreciated by those of medium size.

Higher Profits and Warning by Beralt Tin & Wolfram

WITH an unchanged final of 40 per cent. Beralt Tin & Wolfram, Limited, London, E.C.2, is maintaining the total payment for the year ended March 31, 1961, at 60 per cent. Net profit increased to £152,130 (£127,449), after tax of £88,937 (£85,415).

The directors state that the price of wolfram remains at an unsatisfactory level, and that if this persists, it will affect the profits for the current year.

THE BLYTH DEPOT of Singlehurst Equipment, Limited, specialists in industrial hose and high-pressure flexible pipes and fittings, has been transferred to 29, Carlton Street, Blyth (Northumberland). The depot remains under the management of Mr. Angus Galloway.



How was this made?

Consult Birkett, Billington and Newton

Non-Ferrous & High Duty Iron Castings

This intricate hollow design casting in aluminium-bronze is only one of the many different specials regularly produced each week by the BIRSO foundries. Welded together from six separate sections to make a complete unit measuring 6ft by 4ft, the design is a patent of W. Knowles Trotman and used in the manufacture of paper and board throughout the world. We are specialists in the casting of specials—contact us today for full details of our facilities—and if you've a really difficult casting specification, send that too.

from a few ounces to 20 tons

In phosphor-bronze, manganese-bronze, aluminium bronze, gun-metal and light alloys. Specialists in high-tensile aluminium bronze castings, centrifugal cast wheel blanks, shell moulded castings, chill-cast and continuous cast phosphor-bronze rods and tubes in exact lengths up to 12 feet.

BIRSO TRADE MARK BN

NON-FERROUS CASTINGS, HIGH DUTY IRON CASTINGS, PRECISION MACHINED BUSHES AND BEARINGS

T. M. BIRKETT, BILLINGTON & NEWTON LTD

HANLEY AND LONGPORT, STOKE-ON-TRENT, ENGLAND

Head Office: HANLEY, Phone: Stoke-on-Trent 22184/5/6/7. **LONGPORT, Phone: Newcastle, Staffs 51433/4**

Imports and Exports of Iron and Steel

FIGURES of imports and exports of iron and steel in July are given in the following tables, based on the Board of Trade returns, and including totals for the first seven months of 1960 and 1961.

Total Exports of Iron and Steel

Destination.	Month ended July 31.	Seven months ended July 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	206	3,935	3,250
Sierra Leone	538	3,135	6,447
Ghana	959	11,394	10,405
Nigeria	3,476	37,189	42,193
Union of South Africa	6,239	43,922	39,069
South-West Africa	1,205	4,866	9,416
Rhodesia and Nyasaland	1,498	15,191	20,148
Tanganyika	2,636	8,478	17,567
Kenya	4,545	17,550	25,574
Uganda	142	718	1,694
Mauritius	105	2,731	1,342
Bahrein, Qatar, and Trucial States	2,605	8,496	12,644
Kuwait	597	4,777	11,523
India	14,167	166,740	122,268
Pakistan	7,653	42,240	55,535
Singapore	1,178	11,774	16,043
Malaya	1,639	11,467	15,662
Ceylon	2,329	32,080	25,953
British North Borneo	165	2,531	1,335
Hongkong	8,783	48,940	49,777
Australia	6,493	100,522	87,739
New Zealand	14,683	62,708	157,199
Canada	8,774	139,348	80,087
Jamaica	948	14,269	10,064
Trinidad	4,268	26,796	27,186
British Guiana	431	5,421	5,709
Other Commonwealth countries	3,197	15,783	18,012
Eire	7,430	35,443	44,900
Soviet Union	1,722	20,108	13,662
Finland	5,033	28,201	35,975
Sweden	10,142	106,827	100,310
Norway	12,822	69,977	79,770
Denmark	11,829	59,270	60,577
Poland	4,929	6,769	17,578
Western Germany	13,675	87,404	65,827
Eastern Germany	2,017	14,721	15,932
Netherlands	8,110	77,712	78,127
Belgium	3,170	22,295	17,923
France	627	4,682	7,743
Switzerland	1,168	7,555	13,458
Portugal	2,675	9,324	16,011
Spain	2,485	31,027	14,145
Italy	6,210	24,917	40,541
Austria	484	3,095	3,196
Yugoslavia	824	24,102	19,911
Greece	2,656	11,766	21,837
Turkey	1,486	7,589	10,940
Netherlands Antilles	628	2,434	1,062
Portuguese East Africa	242	2,773	1,626
Egypt	3,255	6,975	20,425
Libya	866	10,564	5,786
Sudan	962	5,831	6,143
Israel	1,308	12,307	13,986
Saudi Arabia	76	298	822
Iraq	1,607	18,606	23,803
Iran	1,806	43,339	20,208
Burma	319	4,314	3,306
Thailand	452	3,545	3,447
Indonesia	68	17,320	2,659
China	12	35,691	10,097
Japan	19,049	43,662	104,545
Philippine Republic	483	5,345	2,854
USA	10,676	148,558	75,924
Cuba	29	5,452	956
Mexico	291	4,314	2,449
Colombia	1,519	5,949	7,394
Venezuela	4,141	24,261	17,253
Ecuador	209	1,609	1,764
Peru	443	4,404	5,140
Chile	126	2,187	2,187
Brazil	948	21,180	11,585
Uruguay	343	5,271	5,274
Argentina	19,813	57,338	105,092
Other foreign countries	5,904	36,861	44,594
TOTAL	274,548	2,026,173	2,052,585

Exports of Iron and Steel by Product

Product.	Month ended July 31.	Seven months ended July 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	12,699	102,095	61,428
Ferro-columbium (niobium)	14	78	51
Ferro-tungsten	76	514	657
Other ferro-alloys	377	6,172	2,249
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars) and similar primary forms	12,518	20,792	67,674
Pieces roughly shaped by forging	212	775	1,523
Iron bars, rods, angles, shapes, and sections	291	1,102	1,414
Steel bars, rods, angles, sections, and shapes	54,214	378,057	417,097
Iron plates and sheets	16	527	318
Universal plates	1,687	13,004	10,143
Steel plate, 3 mm. and under 4.5 mm. thickness	2,697	24,344	22,869
Ditto, 4.5 mm. or more in thickness	32,176	204,516	212,961
Blacksheets and blackplate	27,739	179,402	225,390
Hoop and strip	8,885	70,511	72,251
Tinplate	38,581	316,852	263,171
Decorated tinplate	390	2,970	3,975
Galvanized sheets	5,707	49,991	43,394
Other (incl. tinned sheets, terneplate, and ternesheets)	3,410	15,746	24,539
Railway and tramway construction material	9,844	102,415	124,133
Wire rods of steel (incl. alloy steel)	3,368	33,437	37,891
Wire	11,479	72,143	81,519
Tubes, pipes, and fittings	48,174	440,730	377,956
TOTAL	274,548	2,026,173	2,052,585

Total Imports of Iron and Steel

From	Month ended July 31.	Seven months ended July 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	2,322	20,877	22,009
Rhodesia and Nyasaland	126	4,325	17,550
Canada	3,903	95,206	64,012
Other Commonwealth countries and Eire	16,173	21,914	33,467
Soviet Union	—	22,811	9,914
Sweden	2,381	28,573	30,066
Norway	9,441	89,843	69,694
Poland	—	8,056	652
Western Germany	1,163	90,695	16,979
Netherlands	9,324	129,409	69,492
Belgium	1,206	73,272	23,627
Luxembourg	111	9,530	10,130
France	987	42,099	12,432
Italy	40	18,443	306
Austria	514	7,845	3,268
Japan	502	4,015	4,402
USA	510	252,405	8,344
Other foreign countries	916	59,368	7,536
TOTAL	49,619	978,686	403,880
Iron and steel scrap and waste fit only for the recovery of metal	883	97,834	12,744

AN AGREEMENT has been reached between Turner & Newall, Limited, and the Government of Eastern Nigeria, for the joint financing of an asbestos cement project at a cost of about £1,000,000. The plan provides for the erection of an initial unit for the production of asbestos cement on a 16-acre site at Emene. The Government, which is to take the major shareholding, has agreed to provide railway sidings and other facilities as well as the usual financial concessions offered to new industries. The firm will be known as Turners Asbestos Cement (Nigeria), Limited.

what helps to make the BEER so CLEAR?

Who makes a high-speed filter, for sloe-gin?
Or a reliable filter, for fast dye?
Who takes the bits, from bitumen and strains the sauce, at source?
In fact, who *really* makes a filter for *everything* that f-l-o-w-s?
In AUTO-KLEAN's literature

you'll find a filter for every fluid, together with a hundred-and-one applications . . .

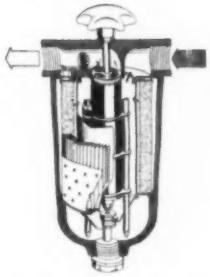
There's the world's first and finest range of fully automatic self-cleaning filters . . . as well as filters that combine the advantages of both paper and plate elements . . . magnetic filters . . . micronic filters . . . discharge filters—and many more. Quite a selection, and it goes on growing daily. That is why when you specify AUTO-KLEAN you can be sure of the best in modern filtration techniques

YOU CAN PUT YOUR TRUST IN AUTO-KLEAN

AUTO-KLEAN STRAINERS LTD. Engineers in Filtration
Lascar Works, Hounslow Middx. Tel: HOUnslow 7722 (10 lines)

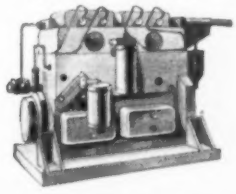
The MICOM is the Auto-Klean filter most frequently selected for the protection of diesel engine lubrication and other similar re-circulatory systems.

. . . This dual-action AUTO-KLEAN Micom filter



Principle: The Auto-Klean MICOM has a unique dual-element filter, the bulk of the incoming fluid being passed through a plate-type element while the remainder is passed through a paper one. Also incorporated is a magnetic unit for the additional removal of micronic ferrous particles.
Advantages: This continuous *double-action* has the following advantages: (1) All filtered liquid from both the plate-type element and the paper element passes direct to the *clean* side of the system—giving maximum possible protection; (2) Even when severe build-up occurs on paper element, the paper cannot collapse; (3) Build-up on the paper does not in any way increase the pressure drop across the filter; (4) The plate-type element can be automatically cleaned—without dismantling—by the turn of a handle; (5) Last-but-not-least advantage of the MICOM is its small, lightweight construction.
Data: Available for working pressures up to 50 p.s.i. and flows of up to 6,750 gallons per hour. Range includes defined meshes from 0·001″ to 0·003″. Can be supplied with ratchet gear for link drive from moving mechanism.

More details on request.



Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in July, and the totals for the first seven months of this year and last, are given below.

	Month ended July 31	Seven months ended July 31.	
	1961.	1960.	1961.
Categories.	Tons.	Tons.	Tons.
Anthracite—			
Large	7,025	43,892	43,668
Graded	25,726	149,363	144,763
Cleaned smalls	35,357	131,491	179,845
All other	37,557	171,672	239,896
Steam coal (including household)—			
Large	42,574	349,859	326,325
Graded	15,241	232,697	150,512
Cleaned smalls	139,116	651,991	805,817
Untreated smalls	128,345	620,089	834,794
Other	12,094	106,120	98,897
Gas coal—			
Unscreened	2,711	120,621	71,758
Graded	29,857	243,142	219,547
All other	2,637	28,971	22,471
Coking coals	6,190	88,753	102,292
TOTAL	484,430	2,938,661	3,240,585
Destinations.			
Canada	12,720	39,325	31,656
Other Commonwealth countries	1,546	19,278	7,019
Eire	110,130	677,416	719,889
Finland	480	25,321	32,786
Sweden	4,893	113,258	108,096
Norway	13,108	71,804	71,821
Denmark	102,322	886,329	697,084
Western Germany	43,707	245,865	304,949
Netherlands	104,484	468,692	692,581
Belgium	29,950	106,523	155,584
France	47,070	104,141	229,348
Portugal	9,315	92,023	95,480
Italy	4,183	64,824	71,303
Other foreign countries	522	23,862	22,989
Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use—			
British flag	7,410	217,247	54,318
Other flags	1,329	25,080	17,075

Exports of Coke and Patent Fuel

THE following table gives figures of exports of coke and manufactured fuels from the United Kingdom during July, and the totals for the first seven months of this year and last.

	Month ended July 31.	Seven months ended July 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Gas coke	59,310	367,914	383,905
Hard coke	50,316	272,858	226,157
Breeze	20,838	235,156	198,847
Manufactured fuel	1,338	66,156	39,732
TOTAL	616,232	3,880,745	4,089,238

NINE APPRENTICES at Leyland Motors, Limited, have been awarded technical State scholarships by the Minister of Education. Four more Leyland apprentices have been placed on the reserve list for this type of scholarship.

Imports and Exports of Mining Machinery

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £195,282 was imported during July, compared with £116,516 in July, 1960. Imports for the first seven months of the year were valued at £1,177,354 against £668,190 in the corresponding period of 1960.

The appended table contains figures of export values of mining and well-drilling machinery in July and values for the first seven months of this year and last.

Destination.	Month ended July 31.	Seven months ended July 31.	
	1961.	1960.	1961.
	£	£	£
Union of South Africa	55,928	316,431	452,423
India	72,530	701,064	628,549
Australia	24,353	250,775	193,845
Canada	47,006	197,853	277,643
Trinidad	22,468	226,750	102,932
Other Commonwealth countries and Eire	83,933	743,737	1,029,296
Argentina	8,222	312,668	27,723
Other foreign countries	242,581	1,763,886	1,726,873
TOTALS.			
Well-drilling machinery—			
Petroleum	96,384	1,618,689	992,123
Other	54,554	346,659	302,215
Mining machinery (excluding portable power tools)—			
Coal-cutters, power operated—			
Complete	32,269	283,643	284,264
Parts	92,783	464,994	494,586
Conveyors, underground—			
Complete and parts	49,112	692,061	507,851
Winders, power operated	25,996	233,467	561,040
All other	205,923	873,651	1,297,207
TOTAL	557,021	4,513,164	4,439,286

Rise in Unemployment, and Fewer Vacancies

AFTER declining steadily for seven months, the number of unemployed in Britain has taken an upward turn. The percentage of the working population out of work on August 14 was 1.4—a rise of 0.2 per cent. over mid-July. This is the highest figure since April and the same as for August last year. Details issued by the Ministry of Labour last week showed that the number of adults who were wholly unemployed had risen by 20,457 to 264,947—more than double the normal seasonal increase for August. Including school-leavers and adults temporarily stopped, the total of unemployed on the register was 304,976—an increase of 46,426 in a month.

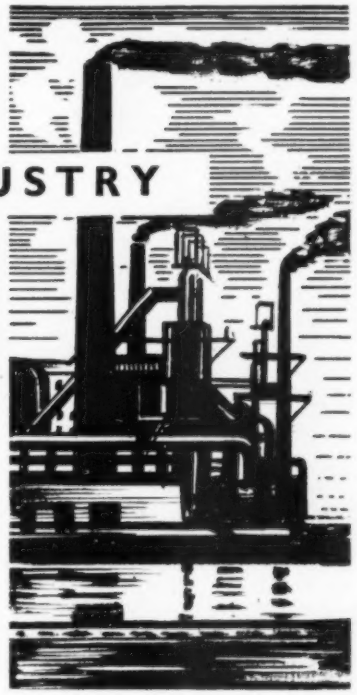
Every region in the country showed a rise in unemployment. The largest increases were in London and the South-East (9,803), the North-West (8,369), the Midlands (8,110), and the North and North-East (5,446). Northern Ireland has 7.5 per cent. of its working population unemployed.

There were 359,499 unfilled vacancies for jobs on August 9—36,020 fewer than in July, which was again more than twice the normal seasonal variation, which is a decrease of about 14,000. Each part of the country showed a fall. The largest declines were in London and the South-East (8,649), the East and South (4,750), and the South-West (3,793).

. . . the protection of plant & equipment

against **CORROSION**

in the STEEL INDUSTRY

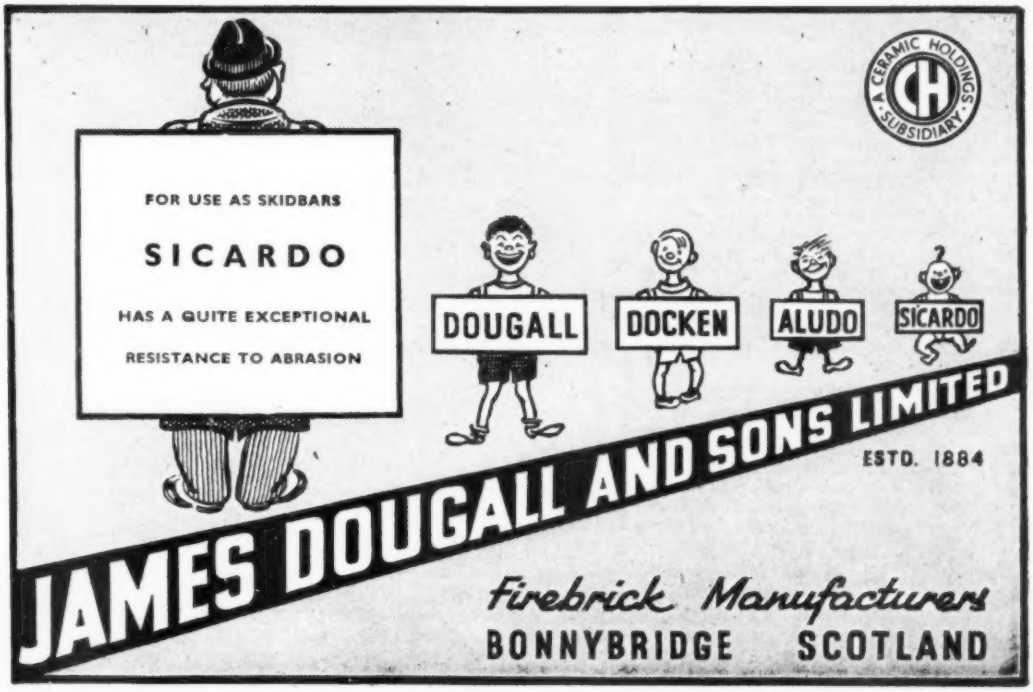


LANSHIELD SAKAPHEN

internationally famous and unique range of Polymer coatings and linings

Resistant to Dew Point Corrosion, these coatings protect Fans and Ducting serving Furnaces and Stoves. Wet Spark Arrestors, Gas Scrubbers, Electrostatic Precipitators and other Plant used for the preparation of By-Products can be given economic life by the use of Lanshield Sakaphen.
For further information and help with your corrosion problems write for a copy of our brochure.

WOLSELEY HOLDINGS LIMITED
CATON ROAD · LANCASTER TELEPHONE . LANCASTER 5252



CURRENT PRICES OF IRON AND STEEL

August 31, 1961

(Basic prices, delivered unless otherwise stated. Prices following side headings marked * are subject to an increase of 1 per cent. under Iron and Steel Board Price Determination, 1961, No. 2)

PIG-IRON

***Foundry and Forge Iron.**—No. 3 iron, Class 2, Middlesbrough, £21 17s.; Birmingham, £21 9s. 3d., 10-ton lots or over.

***Low-phosphorus Iron.**—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

***Basic Pig-iron.**—Delivered in Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

***Hematite.**—Si less than 2%, S & P 0·03-0·05%, 10-ton lots or over: N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s.; Birmingham, £25 13s.; South Wales (Welsh iron), £23 19s.

Refined.—Cylinder and refined irons, South Zone, £25 9s., North Zone, £25 6s. 6d. Refined malleable, max. 0·10% P, South Zone £26 9s., North Zone £26 6s. 6d.

MANUFACTURED IRON

(*Bar basis, 2⅛ in. to ¾ in.*)

CROWN IRON: England and Wales (Zone 1), £51 12s. 6d.; Scotland, £51 7s. 6d.; Ireland, f.o.q. Belfast, £54 12s. 6d., all other Northern Ireland ports, £55 12s. 6d., f.o.q. Cable iron, £1 extra.

SEMI-FINISHED STEEL

***Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 100 tons and over, £32 5s. 6d.; hard (0·41-0·60% C), 50 tons and over, £33 17s.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting steel up to 0·25% C, 50 tons and over, £35 4s. 6d. SIEMENS-MARTIN ACID (50 tons and over): Up to 0·25% C, £40 11s.; silico-manganese, £43 4s.

***Billets, Blooms, and Slabs for Forging and Stamping.**—Lots of 50 tons and over. Basic, soft, up to 0·33% C, £37; basic, hard, over 0·41 up to 0·60% C, £38 2s. 6d.; acid, up to 0·25% C, £41 14s.; acid silico-manganese, £44 17s.

Alloy Steel (25 tons and over).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £47 3s., Ni 2·75/3·75%, Cr 0·5/1·10%, £76 5s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo. 0·2/0·65% £86 14s. BARS: 1 in. dia. and up, nickel, £67 16s.; nickel-chrome, £100 18s.; nickel-chrome-molybdenum, £113 11s.

***Other Semi-products, etc.**—Forging ingots, up to 0·60% C, £32 (gross) f.o.t.; tube billets, 50 tons and over, £39 10s.; shell steel billets for direct forging, up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland). 50 tons and over: Soft basic, £39 17s.; hard basic, £43 8s; free-cutting, up to 0·25% C, £45; acid, up to 0·75% C, £54 6s. 6d. Stainless steel billets, 3 in. and larger, 10 tons and over, Austenitic, £228 10s.; martensitic, £133.

FINISHED STEEL

***Heavy Products** (50 tons and over).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £40 7s.; medium plates, all areas of England and Wales, £43 16s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £42 17s.; floor plates, N.-E. Coast, £41 16s. Sections (N.-E. Coast, Midland and Northern Joint Areas, and Central Scotland): Angles, £38 1s. 6d.; bars (rounds and squares), £40 11s. 6d.; flats, £38 6s. 6d.; joists, £37 17s. 6d.

***Rolled and Re-rolled Steel Products.**—N.-E. Coast, Midland, Northern Joint and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 united in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £44 9s. 6d.; hard basic, £41 19s. 6d.; Siemens-Martin acid, £49 12s. 6d.; spring steel, basic, £44 4s. 6d. spring steel, acid, £53 11s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

***Sheets and Strip.**—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 4s. Cold-rolled steel strip, coils, hard temper, not annealed, 20 tons and over, £54 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

***Tinplates and Blackplate.**—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t. maker's works. Cold reduced electrolytic tinplate, 59s. 9d. per basis box, f.o.t. Cold reduced blackplate, 57s. 2d. per basis box, f.o.t.

***Colliery Rails and Arches.**—Arches, 4 in. × 2½ in. × 2 in., re-rolled, £38 15s.; 3 in. × 3 in., re-rolled, £39; 3½ in. × 3½ in., re-rolled, £40 7s. 6d.; 4 in. × 2½ in. × 2 in., prime £43 7s. 6d. Other sections, prime, £43 12s. 6d. Extra fish-plates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled, £37 9s.; 3 in. × 3 in., re-rolled, £37 11s. 6d.; 3½ in. × 3½ in., re-rolled, £38 18s. 6d.; 4 in. × 2½ in. × 2 in., prime. £42 4s. 6d. Other sections, prime, £42 7s. Benk bars; standard type, prime material, all thicknesses, £38 11s, "W" type bars, prime steel, all thicknesses, £41 1s. Standard type, re-rolled, up to ⅜ in., inclusive, £36 3s. 6d., over ⅜ in. to ½ in., inclusive, £37 8s. 9d. "W" type bars, re-rolled, up to ½ in., inclusive, £38 13s. 6d.; over ⅜ in. to ½ in., inclusive, £39 18s. 6d. Light rails, flange, 25 lb. and under, prime, £40 17s. 6d. Flange rails, 25 lb. and under, re-rolled, £39 15s. Fishplates, £50 12s. 6d.

***Bright Steel** (50 tons and over).—Bars, no analysis or test, £53 5s.; flats, untested, £70 16s. 6d.

High-speed Tool Steel.—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

***Rails, etc.**—F.B. rails, 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.

BLAST-FURNACE COKE

(*F.O.T. at Ovens*)

DURHAM AND NORTH-EAST COAST: 177s. 6d. SOUTH WALES: 174s. 7d. NOTTS AND DERBY: 150s. 7d. LANCASHIRE: 162s. 7d. STAFFORDSHIRE: 156s. 2d. YORKSHIRE: 155s. 1d. SCOTLAND: 187s. 11d. All prices subject to quality differentials.

STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

	Scotland.	N.-E. Coast.	Midlands.	Sheffield.	Lancs.	S. Wales (East)	S. Wales (West)
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Heavy steel scrap*	229 3	228 3	220 0	226 3	226 3	227 3	232 3
Heavy mixed scrap*	207 3	206 3	198 6	204 3	203 9	205 3	210 3
Heavy steel turnings† ..	179 9	179 9	169 9	176 9	174 3	177 0	180 0
Heavy cast iron†	206 9	203 9	208 0	204 3	189 3	199 3	205 9
Cast-iron borings†	160 3	157 3	157 0	159 9	157 3	159 6	164 6

* Not less than 500 tons delivered within three months.

† Not less than 250 tons delivered within three months.

Provisionally Patented

PHOTOGRAPH BY KIND PERMISSION OF
No. 7 AREA N.E. DIV. N.C.B.

GOODALL
CLAYTON

'SHARLSTON' AUTOMATIC MINE CAR BOOM LOADER

- ✲ Prevents Breakage at Loading Points
- ✲ F.L.P. Motorised Drum Drive
- ✲ Pneumatic or Hydraulic Automatic Lifting and Lowering
- ✲ Up to 450 Tons Per Hour in 3 ton cars

Further Details on Request

GOODALL, CLAYTON & CO. LTD., PEPPER ROAD WORKS, LEEDS 10, YORKS.

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: **Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Number 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATION WANTED

METALLURGIST, 43, F.I.M., M.I.B.F., earning £2,000 p.a., seeks executive position with small firm. Wide knowledge and experience of metallurgy of cast iron, iron and steelmaking. Box MF418, IRON AND COAL.

SITUATIONS VACANT

ROLLING MILL MANAGER

APPLICATIONS are invited for the post of MILL MANAGER in small iron steel works on North East Coast. Must have good experience in rolling merchant bar and guide mill sections particularly special shapes in medium and high carbon, alloy and stainless steels. Must be competent to check setting up of mill, able rectify faults during rolling and capable of sustaining high outputs of good quality. This is a senior position with excellent promotion opportunities. Life Assurance and Pension Schemes. Car provided. Applications stating full particulars of career and present salary, to be addressed and marked "Confidential" to the CHAIRMAN, Box RM421, IRON AND COAL.

PLANT MANAGER

TO take charge of Plant Section of Mining and Civil Engineering Contractors in South Wales. Apply, in writing, giving full particulars of experience and salary required to Box PM420, IRON AND COAL.

NATIONAL COAL BOARD
DURHAM DIVISION
WORKSHOPS SUPERINTENDENT

REQUIRED for Area Central Workshops at Lambton, Co. Durham. The works employ about 600 men, are mainly engaged in the repair of mechanical and electrical coal mining machinery and include a Machine Shop, Plate and Construction Shop, Blacksmith's and Heat Treatment Shop, Locomotives and Wagon Repair Shop, Electrical Shop and Iron and Brass Foundry.

Applicants should have a proved engineering background, a comprehensive experience of modern management and production techniques at workshop floor level. They should preferably hold a Higher National Certificate in Mechanical and/or Production Engineering with an electrical endorsement. The successful candidate will act as assistant and report to the Workshops' Manager.

Starting salary according to experience and qualifications, within the range £1,000—£1,500. Excellent superannuation scheme and conditions of service.

Apply within 7 days, giving details of age, educational qualifications and experience to AREA STAFF MANAGER, N.C.B. No. 2 Area, 2, Thornhill Park, Sunderland.

SITUATIONS VACANT—*contd.*

INLAND REVENUE VALUATION OFFICE

PENSIONABLE posts for qualified men as 3rd CLASS VALUERS in the Mineral Section, which has offices in London, Birmingham, Leeds, Newcastle upon Tyne, and Cardiff. Age: at least 24 and under 34 on 1.10.61; extension for candidates with regular Forces service or Overseas Civil Service. Qualifications: Final examination of R.I.C.S., C.A. and E.A.I., or C.L.A.S., or B.A. (Cantab.) or B.Sc. (Lond.) in Estate Management (preferably Final examination of R.I.C.S. in Mining sub-division) or 1st Class Certificate of Competency (Mine Managers); knowledge of mining subsidence and the principles of valuation of minerals; at least 4 years' experience of mining. Starting salary from £858 (24) to £1,258 (34 or over); scale maximum £1,430. Promotion prospects. Write CIVIL SERVICE COMMISSION, Burlington Gardens, London, W.1, for application form, quoting 149/61/42. Closing date 17th October, 1961.

NORTH STAFFORDSHIRE COLLEGE OF TECHNOLOGY STOKE-ON-TRENT

Principal: E. R. PATRICK, Ph.D., B.Eng., A.M.I.Mech.E., A.M.I.E.E.

MINING DEPARTMENT

APPLICATIONS are invited for a post as LECTURER in the Mining Department, to commence as soon as possible.

Candidates must either hold a degree in Mining, or equivalent qualifications, with special knowledge and experience in the fields of coal preparation and solid fuels.

The salary scale is £1,370 to £1,550; increments on the scale may be granted for appropriate experience.

Forms of application may be obtained from the PRINCIPAL, to whom they should be returned as soon as possible.

H. DIBDEN,
Clerk to the Governors.

AUCTIONEERS AND VALUERS

Sales and Valuations of Industrial Property, Plant and Machinery, throughout the British Isles.

Messrs.

HILLIER, PARKER MAY & ROWDEN

77, GROSVENOR STREET, LONDON, W.1. *Mayfair 7666.*

AUCTIONEERS AND VALUERS —*contd.*

HENRY BUTCHER & CO.

Specialists Auctioneers and Valuers of Plant and Machinery Factory Agents and Surveyors

Fire Loss Assessors

73 CHANCERY LANE
LONDON, W.C.2
Telephone: HOL. 8411 (8 lines)

MICHAEL FARADAY & PARTNERS

Established 1896

CHARTERED SURVEYORS

Valuations of Factories, Works & Plant for all purposes.

Specialists in Rating & Derating of Industrial Premises, Machinery & Plant

40, BROOK STREET, LONDON, W.1

Telephone: GROsvenor 8446 (5 lines)

FULLER HORSEY
SONS & CASSELL

Specialists in the

SALE & VALUATION

of INDUSTRIAL PLANT & PROPERTIES of ALL TYPES

SINCE 1807

10 LLOYD'S AVENUE
LONDON E·C·3
TELEPHONE: ROYAL 4861

MACHINERY FOR SALE

RAPIER 3-ton Super Diesel Electric Mobile Crane, on pneumatics.

JOSEPH PUGSLEY & SONS, LTD.,
Bristol, 5.
Tel.: Bristol 56037.
Grams.: "Piston," Bristol.

MACHINERY FOR SALE—*contd.*

TWW

HORIZONTAL Three Throw Hydraulic Pump by Henry Berry, rams 1¼ in. × 3 in., 5 g.p.m./1,500 lbs., vee drive.

Four Fraser Mono Radial Pumps, 30 g.p.m./3,200 lbs., motorised 400/3/50.

50 ton Hand Operated General Purpose Hydraulic Presses, 12 in. stroke, adjustable daylight, max. 42 in., width between frames 42 in.

New Pilot Self Contained Downstroking Hydraulic Presses of 3, 12 and 15 ton capacities.

Two 75 ton Hydraulic Upstroking Presses by Fawcett Preston, table 26 in. × 22½ in. b/f, 20 in. stroke, max. daylight 30 in. with push back rams.

100 ton Vertical Downstroking Hydraulic Press by Fielding & Platt, 6 ft. stroke, daylight 8 ft. 3 in., working area 27 in. × 25 in., with Fraser Mono Pump.

190 ton Vertical Upstroking Hydraulic Press by John Shaw, 17 in. stroke, 40 in. daylight, platen size 30 in. × 28 in., distance between columns 36 in.

400 ton Vertical Downstroking Hydraulic Press by Francis Shaw & Sons, 42 in. daylight, 38 in. stroke, distance between columns 38 in. × 17 in.; W.P. 3,000 lbs. p.s.i.

THOS W. WARD LTD.
ALBION WORKS · SHEFFIELD
Phone: 26311 Ext. 307.
Grams: Forward, Sheffield.

Remember - Wards might have it!

MACHINERY FOR SALE—*contd.*

FOR SALE.

SECONDHAND Steel Sections, Channels, Angles and Joints. Secondhand Railway Material.

THE MOTHERWELL MACHINERY & SCRAP CO., LTD.
P.O. Box No. 15, INSHAW WORKS, MOTHERWELL.
Telephone: Motherwell 4536/7/8.
Telegrams: "Scrap" Motherwell.

600

TWO 2½ ton capacity CAPSTANS by Stothert & Pitt, each driven by 28 h.p. 400/3/50 slipring motor, with control gear.

GEORGE COHEN
SONS & CO., LTD.
WOOD LANE, LONDON, W.12.
Tel.: Shepherds Bush 2070.
and STANNINGLEY, nr. LEEDS.
Tel.: Pudsey 2241.

COLVILLES LIMITED have available for disposal at General Terminus Ore Quay, Glasgow:
Two 70 cu. ft. (4 rope) Priestman "Trojan" Grabs.
Weight 5.2 tons each.
Units purchased end of 1957 and have never been used.
Price asked £1,550 each.
Replies to PURCHASING MANAGER, 195 West George Street, Glasgow, C.2.

WANTED URGENTLY

Discarded Sacks, Slag Bags, Old Sacking.

For good prices and prompt settlement sell to actual users.

JOHN COTTON
(JUTE LTD.)
NUNBROOK MILLS
MIRFIELD · YORKSHIRE
Tel: Mirfield 3306-7

For **TURBINE PUMPS**
WRITE TO
PULSOMETER ENG. CO., LTD.
READING
LONDON OFFICE:—
PULSOMETER HOUSE,
20/26 LAMB'S CONDUIT STREET, W.C.1.

COPPER BLAST FURNACE TUYERES
REAY BRASS FOUNDRY CO. LTD. STOCKTON-ON-TEES
Telephone: 65295-6

SUBSCRIPTION ORDER FORM.

To the PUBLISHER

IRON & COAL

TELEPHONE: TRAFALGAR 6171
JOHN ADAM HOUSE · 17/19 JOHN ADAM STREET ADELPHI · LONDON · W.C.2
TELEGRAMS: "ZACATECAS, RAND, LONDON"

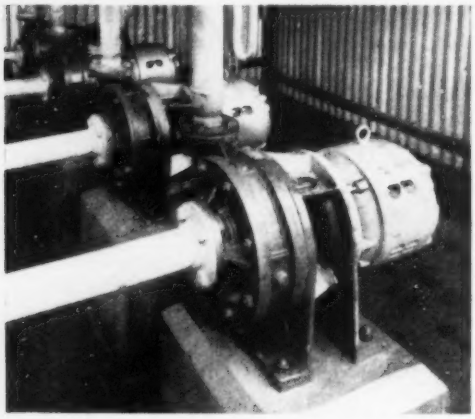
Please send the IRON AND COAL to the address given below until countermanded, for which **£2. 12s. 0d.** (Home) **£3. 0s. 0d.** (Abroad) is enclosed in payment of One Year's Subscription.

Name .....

Address .....

Date .....

Cheques and Post Office Orders to be made payable to:—
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LTD.



Moving Spirits

At the Birmingham Depot of Wm. Butler & Co. (Bristol) Ltd., 7,000,000 gallons of petroleum, chemicals, disinfectants and kindred fluids are pumped annually from tanker to storage Tank and vice versa by this battery of SAFRAN S.C.E. pumps.

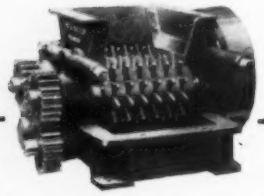
SAFRAN REGISTERED TRADE MARK PUMPS

SAUNDERS VALVE COMPANY LIMITED
PUMP DIVISION, DRAYTON ST., WOLVERHAMPTON

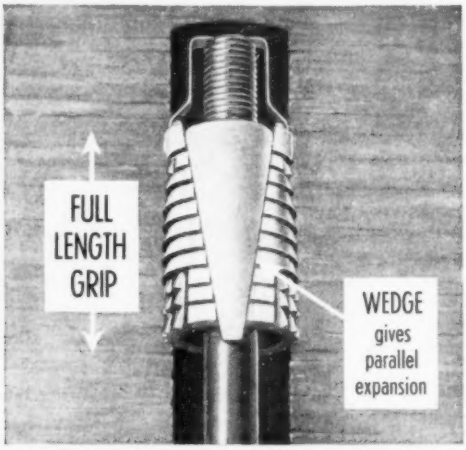
R·B Coke Cutting MACHINES

Finger Coke will blind screens but the installation of R & B Machines immediately stops this nuisance.

Where doubt exists, let us arrange a free trial on your particular coke.



RIDE & BELL Limited
RETFORD · NOTTS.

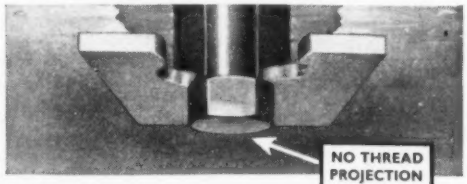


'PATTIN'

ROOF BOLTS FOR SAFETY

With their double-expanding, parallel-action shells, 'PATTIN' roof bolts are easily inserted in hard or soft strata ; their superior anchorage has established them as the most widely used strata bolts in the U.S. coalfields. They can be positioned at any depth in the hole and the bolt portion is often reclaimable. FAST TO INSTALL, SIMPLE, ECONOMICAL.

EWART



Practical demonstration or literature on request

EWART CHAINBELT CO. LTD
DERBY Telephone: Derby 45451
Strata Bolt Engineer: A. CADMAN. Telephone: Goldthorpe 2303

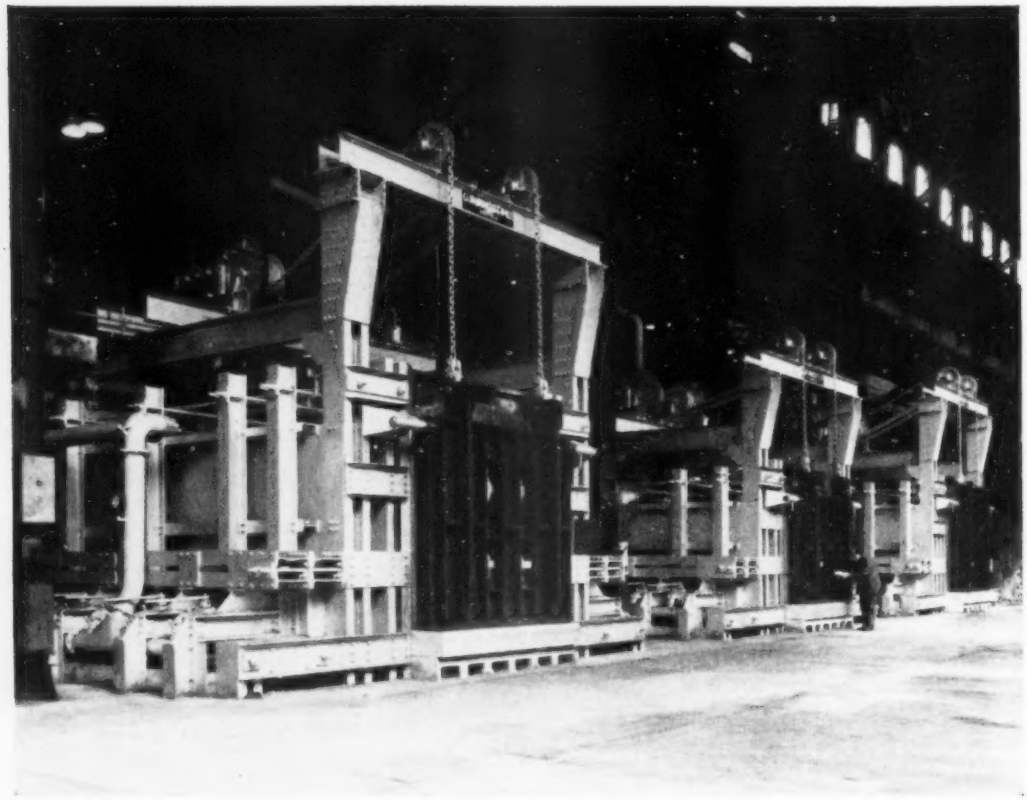
FROTH FLOTATION

unifloc introduces the NEW SUPER CELL 72" x 72"

LARGE SAVINGS IN POWER, SPACE AND COST

unifloc

UNIFLOC LIMITED, SWANSEA, GREAT BRITAIN
TEL: 55164 (3 lines) GRAMS: 'UNIFLOC' S. WALES



HEAVY FORGE FURNACES

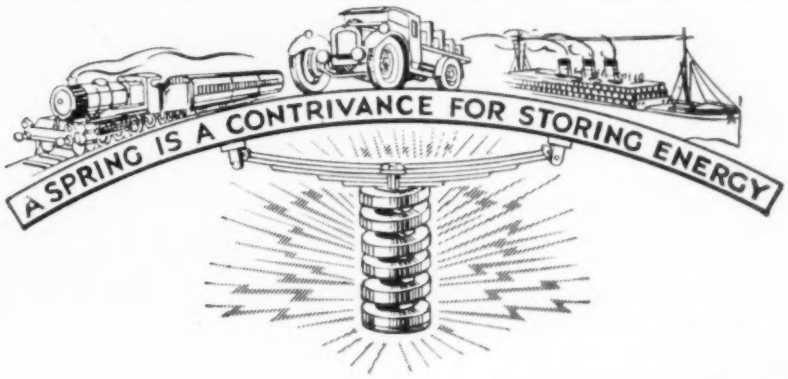
The three reheating furnaces illustrated above were recently installed at the River Don Works of The English Steel Corporation Ltd., for the production of large forgings.

They are fired with clean cold producer gas and are of the reversing regenerative type. Each furnace is equipped with instruments for automatic reversal on a variable time basis, automatic control of the air/gas ratio and furnace pressure, and fully-floating temperature control.

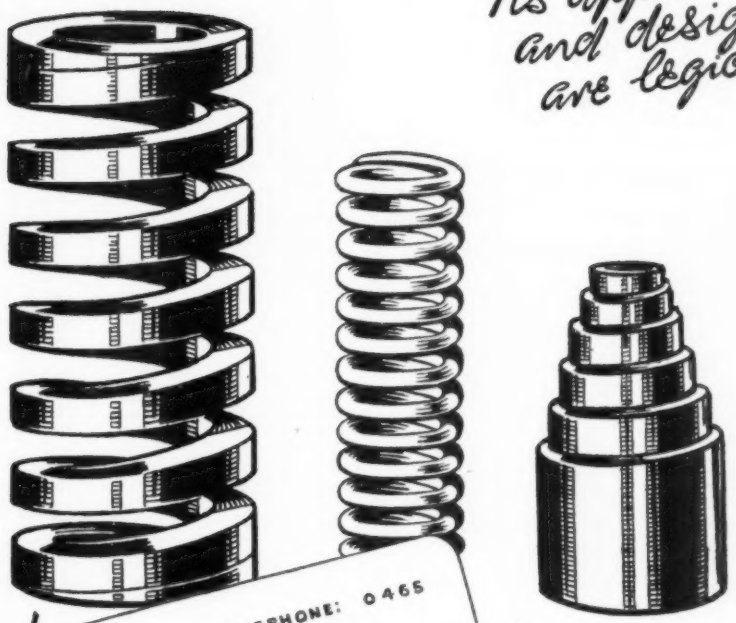
Wincott
FURNACES

G. P. WINCOTT LIMITED, SHEFFIELD, ENGLAND

TELEPHONE 20211 (2
TELEGRAMS WINCOTT SHEFFIELD



Its application and design are legion



TELEPHONE: 0465

The **WEST BROMWICH SPRING CO. LTD.**

Manufacturers of Springs and Spring Pressings of every kind

GEORGE ST., WEST BROMWICH

STEEL CASTINGS

For all purposes

★ **Black or Machined**

Special attention given to orders for Castings for Breakdown Work.

HORNSBY & GOODWYN LTD.

Steel Founders

SCUNTHORPE

Phone: 2231 & 2 (2 lines). Grams: Machinery SCUNTHORPE
London Office: 313 Balham High Rd., S.W.17. Tel: Balham 9855.

THE HIGHEST STANDARD OF EFFICIENCY AND RELIABILITY

"WHITTAKER"

BRICKMAKING MACHINERY

Sole Makers and Patentees—

C. WHITTAKER & CO. LTD.

ACCRINGTON.

BURNSIDE

for BORING

Burnside's IMPROVED Safety Hydraulically-operated Boring Apparatus

ROTARY CORE RECOVERY BY CONTRACT

Extra Long Hole Boring Machines, Long Hole Boring Machines, Drilling Machines, Earth and Well Boring Tools.

GEO. BURNSIDE LTD.

Shiney Row, Houghton-le-Spring, Co. Durham, England
Telephone : 17 Fence Houses
Telegrams: Burnside Shiney Row
Established 1885

Macbeth

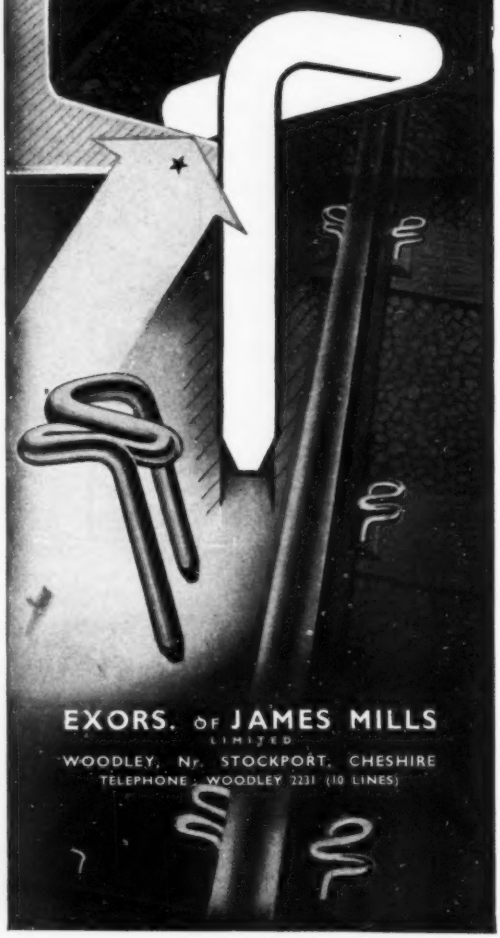
PATENT

Resilient **SPIKES**

TYPE No. 2

☆ POSITIVE RESILIENT GRIP SECURES THE RAIL.

MINIMISES MAINTENANCE COSTS



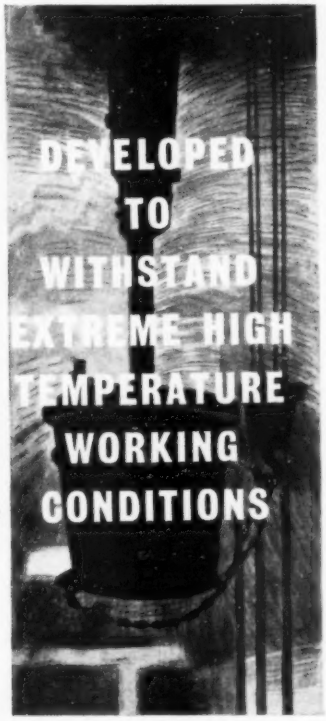
EXORS. OF JAMES MILLS

LIMITED

WOODLEY, Nr. STOCKPORT, CHESHIRE

TELEPHONE : WOODLEY 2231 (10 LINES)

ONX PRODUCTS



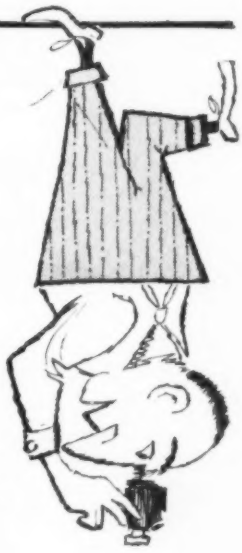
FIRE CEMENTS AND REFRACTORY CASTING MORTARS FOR ALL INDUSTRIES

Efficient construction and repair of all kinds of brickwork subjected to high temperatures has its reward in increased production and plant efficiency. A. L. Curtis (ONX) Ltd. have made a lifetime's study of heat resisting materials and the "Onx" range of fire cements and refractory casting mortars is the result of continuous development and research in our own laboratories.

Phone:
CHATTERIS 61
Grams:
WESTMORLAB
CHATTERIS

A. L. CURTIS (ONX) Ltd
WESTMOOR WORKS, CHATTERIS, CAMBS.

Have you a LOW HEAD problem?



If so, Harland has the answer. The Sturdily built, all purpose 'Monoglide' single stage pump has been specially designed for the movement of water and other fluids, at low heads. Its reputation for completely reliable operation over protracted periods has made it a firm favourite with users of small pumps in every walk of life, including industry, the estate or farm, public service, etc. So, if long and efficient service is your goal specify . . .

MONOGLIDE
SINGLE STAGE PUMPS

HARLAND

THE HARLAND ENGINEERING CO. LTD.,
WORKS:
ALLOA SCOTLAND & TIMPERLEY CHESHIRE
LONDON & EXPORT SALES OFFICE:
HARLAND HOUSE 20 PARK STREET LONDON W1
Branches in Bristol Glasgow Leeds Newcastle Nottingham Timperley (Cheshire) Wolverhampton and overseas

A 101/3

INDEX TO ADVERTISERS—*continued from page 64.*

Jenkins, W. J. & Co. Ltd. .. —
Johnson Rolls Ltd. .. .. —
Jones, W. Stanley (Engineers) Ltd. .. .. .. —
Joy, Sullivan Ltd. .. .. —

Kennedy, Allan & Co. Ltd. .. —
Kenyon, Wm. & Sons Ltd. .. —

Lafarge Aluminous Cement Co. Ltd. .. .. —
Lanarkshire Bolt Ltd. .. —
Lanarkshire Steel Co. Ltd. .. —
Lancaster & Tonge Ltd. .. —
Lane, Francis & J. S. Ltd. .. —
Ledward & Beckett Ltd. .. —
Lever, J. & Sons Ltd. .. —
Lilleshall Co. Ltd. .. .. —
Lindley, H. Ltd. .. .. —
Lloyd s (Burton) Ltd. .. .. —
Locker Industries Ltd. .. —
Lodge-Cottrell Ltd. .. .. —
Lumb, Jas. & Sons Ltd. .. —
Lysaght's, Scunthorpe Works —

Mackley, E. N. & Co. Ltd. .. 28
M. & C. Switchgear Ltd. .. —
Markham & Co. Ltd. .. .. —
Marley, Wilfred Ltd. .. .. —
Marshall, Thos. & Co. (Loxley) Ltd. .. .. .. —
Martin Black & Co. (Wire Ropes) Ltd. .. .. .. —
Massey, B. & S. Ltd. .. .. —
Mastabar Mining Equipment Co. Ltd. .. .. .. —
Mather & Platt Ltd. .. .. —
Matthews & Yates Ltd. .. —
Mavor & Coulson Ltd. .. —
McClure, David Ltd. .. .. —
Mellowes & Co. Ltd. .. .. —
Merer Ltd. .. .. .. —
Metalectric Furnaces Ltd. .. —
Michael & Partners Ltd. .. —
Midgley & Son Ld. .. .. —
Millom Hermatite Ore & Iron Co. Ld. .. .. .. —
Mills, James Exors. of .. 60
Mine Safety Appliances Co. Ltd. .. .. —
Mining Engineering Co. Ld. .. —
Mitchell Ropeways Ld. .. —
Mobil Oil Co. Ld. 30
Mobile Lifting Services Ld. .. —
Moler Products Ld. .. .. —
Mond Nickel Co. Ld. .. .. —
"Monitor" Patent Safety Devices Ld. .. .. —
Mono Pumps Ld. .. .. —
Moorwood, John M. Ld. .. —
Morgan Refractories Ld. .. —
Morris, Robert Ld. .. .. —
Mowlem-Centraline .. .. —
Murex Welding Processes Ld. —
Muschamp, N. J. & Co. Ld. .. —

National Boiler & General Insurance Co. Ld. .. .. —
National Coal Board .. —
National Industrial Fuel Efficiency Service .. .. —
Neal, R. H. & Co. Ld. .. 27
Needham Bros. & Brown Ld. —
Nelson, W. & H. Ld. .. .. —
New Conveyor Co. Ld. .. —
Newell, Ernest & Co. Ld. .. —
Newton Chambers & Co. Ld. 4 & 5
Niagara Screens & Plant Ld. 63
Nife Batteries .. .. .. —
Nordberg Manufacturing Co. Ld. .. .. —
North British Rubber Co. Ld. —
North Eastern Marine Engineering Co. Ld. .. .. —
Northfield Industrial Fabrications Ld. .. .. —
Norton Harty Engineering Co. Ld. .. .. —
Norton, Sir James Farmer & Co. Ld. .. .. .. —
Nortons Tividale Ld. .. —

Oldham & Son Ld. .. .. —
Ormerod, Edward & Co. Ld. —
Osborn, S. & Co. Ld. .. —
Oughtibridge Silica Firebrick Co. Ld. .. .. .. —

Padley & Venables Ld. .. —
Parkes, Timothy, & Sons Ld. —
Parramore, F. & Sons Ld. .. —
Parsons, C. A. & Co. Ld. .. —
Parsons Chain Co. Ld. .. —
Parsons Marine Turbine Co. —
Patterson Lamps (1953) Ltd. 10
Peebles, Bruce, & Co. Ld. .. —
Pegson Ld. .. .. .. —
Permutit Co. Ld. .. .. —
P.G. Engineering Ld. .. —
Pickford, Holland & Co. Ld. —
Pittrail Ld. .. .. .. —
Power-Gas Corporation Ld. .. —
Power Gas Economy Co. .. —
Power Plant Co. Ld. .. —
Premier Cooler & Engineering Co. Ld. .. .. .. —
Press, Wm. & Son Ld. .. —
Price, J. T. & Co. Ld. .. —
Priest Furnaces Ld. .. .. —
Procter Bros. (Wireworks) Ld. —
Prolloy Mining Developments Ld. .. .. .. —
Protector Lamp & Lighting Co. Ld. .. .. .. —
Pulsometer Eng. Co. Ld. .. 55

Qualter Hall & Co. Ld. .. 37

Railway & General Engineering Co. Ld. .. .. —
Raine & Co. Ld. .. .. —
Ransomes & Marles Bearing Co. Ld. .. .. .. —
Rapid Magnetic Ld. .. .. —
Rawlplug Co. Ld. .. .. —
Reavell & Co. Ld. .. .. —
Reay Brass Foundry Co. Ld. 55
Reid Gear Co. Ld. .. .. —
Reliance Rope Attachment Co. Ld. .. .. .. —
Renold Chains, Ld. .. .. —
Reside, Jas. Ld. .. .. —
Revolvo Ld. .. .. .. —
Reyrolle, A. & Co. Ld. .. —
Rheolaveur General Construction Ld. .. .. .. —
Rhodes, S. & Co. Ld. .. 63
Rhymney Engineering Co. Ld. —
Richards, Chas. & Sons Ld. .. —
Richards Structural Steel Co. Ld. .. .. —
Richardsons Westgarth Atomic Ld. .. .. —
Richardsons Westgarth (Hartlepool) Ld. .. .. .. —
Ride & Bell Ld. 56
Rigley, Wm. & Sons Ld. .. —
Robertson, W. H. A. & Co. Ld. —
Robey & Co. Ld. 11
Rocol Ld. .. .. .. —
Rolled Steel Products (London) Ld. .. .. .. —
Ropeways Ld. .. .. —
Ross Engineers Ld. .. .. —
Round Oak Steel Works Ld. —
Ruston & Hornsby Ld. .. —
Ruston-Bucyrus Ld. .. —

Sack, Maschinenfabrik, G.m.b.H. .. .. .. —
Safety in Mines Developments Ld. 39
Salem-Brosius (England) Ld. —
Saunders Valve Co. Ld. .. 56
Sentinel (Shrewsbury) Ld. .. —
Shaw, W. & Co. Ld. 63
Sheen (Nottingham) Ld. .. —
Sheepbridge Equipment Ld. —
Sheffield Twist Drill & Steel Co. Ld. .. .. .. —
Sheffield Wire Rope Co. Ld. —
Shell Mex & B.P. Ld. .. .. —
Siemens-Schuckert (G.B.) Ld. —
Silvertown Rubber Co. Ld. .. —
Simon-Carves Ld. 41
Simon, Richard & Sons Ld. .. —
Siskol Machines Ld. .. .. —
Skefko Ball Bearing Co. Ld. —
Skiningrove Iron Co. Ld. .. —
Smallman, Jas. W. Ld. .. —
Smedley Bros. Ld. .. .. —
Smith & McLean Ld. .. .. —
Smith, John (Keighley) Ld. .. —
Smith, Thos. & Son (Rodley) Ld. .. .. .. —
South Wales Switchgear Co. Ld. .. .. .. —
Spencer-Bonecourt-Clarkson Ld. .. .. .. —
Standall Engineering Co. Ld. —
Stanton & Staveley Sales Ld. 36
Steam & Combustion Engineering Ld. .. .. —
Steel Co. of Wales Ld. .. —
Steels Engineering Products Ld. .. .. .. —
Steelway Ld. .. .. .. —
Stein & Atkinson Ld. .. 65
Stein, J. G. & Co. Ld. .. 42
Stephens Silica Brick Co. Ld. —
Stewarts and Lloyds Ld. .. —
Stockdale Engineering Co. Ld. —
Stoddard, J. & Sons Ld. .. —
Stone-Wallwork Ld. .. .. —
Stothert & Pitt Ld. .. .. —
Strachan & Henshaw Ld. .. 14
Structural Painters Ld. .. —
Sturdy Electric Co. Ld. .. —
Summerson, Thos. & Sons Ld. —
Sutcliffe, Richard Ld. .. 35
Sutcliffe, Speakman & Co. Ld. —

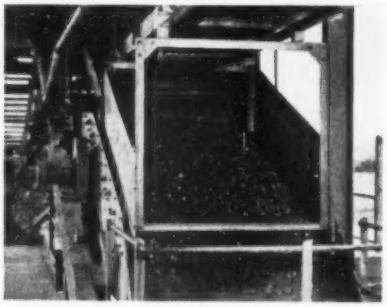
Tattersall & Sons Ld. .. —
Taylor, F. & Sons (Manchester) Ld. .. .. —
Tees Side Bridge & Engineering Works Ld. .. .. —
Thermal Syndicate Ld. .. —
Thomas (Richard) & Baldwins Ld. 23
Thompson, John Conveyor Co. —
Thompson, John (Triumph Stokers) Ld. .. .. —
Thompson, John, Water Tube Boilers Ld. .. .. .. —
Thompson & Southwick Ld. —
Thornton, B. Ld. .. .. —
Thyssen Shaft Sinking Co. Ld. —
Town, Fredk. & Sons Ld. .. —
Trewhella Bros. (Pty.) Ld. .. —
Tungsten Carbide Developments Ld. .. .. .. —
Turner Bros. Asbestos Co. Ld. .. .. —

Underground Mining Machinery Ld. .. .. .. —
Unifloc Ld. 57
United Fireclay Products Ld. —
United States Metallic Packing Co. Ld. .. .. —
United Steel Companies Ld. —
United Wire Works Ld. .. —
Uskside Engineering Co. Ld. —

Vallak, G.B. Ld. .. .. —
Vaughan Crane Co. Ld. .. —
Vauxhall Motors Ld. .. —
Victor Products (Wallsend) Ld. .. .. .. —
Visco Limited .. .. —

Wade, Smith & Co. Ld. .. —
Wailes Dove Bitumastic Ld. —
Walker Bros. (Wigan) Ld. .. —
Wallacetown Engineering Co. Ld. 17
Wallsend Slipway & Engineering Co. Ld. .. .. —
Walmsleys (Wigan) Ld. .. —
Ward, Thos. W. Ld. .. 7
Warner & Co. Ld. .. .. —
Wellman Bibby Co. Ld. .. —
Wellman Smith Owen Engineering Corporation Ld. .. 33
West Bromwich Spring Co. Ld. 59
Westinghouse Brake & Signal Co. Ld. 34
West's (Manchester) Ld. .. —
West's Piling & Construction Co. Ld. .. .. .. —
Westwood, Dawes & Co. Ld. —
Wharton Crane & Hoist Co. Ld. .. .. .. —
Whipp & Bourne Ld. .. .. —
White, R. & Sons (Engrs.) Ld. —
Whittaker, C. & Co. Ld. .. 60
Wickman Ld. .. .. —
Widnes Foundry & Engineering Co. Ld. .. .. —
Wigglesworth, F. & Co. Ld. —
Wild, A. G. & Co. Ld. .. —
Wild, M. B. & Co. Ld. .. —
Willcox, W. H. & Co. Ld. .. —
Wincott, G. P. Ld. 58
Wolseley Holdings Ld. .. 51
Wombwell Foundry & Engineering Co. Ld. .. .. —
Wood, Hugh & Co. Ld. .. 25
Woodall-Duckham Construction Company Limited .. —
Woodhouse, Joseph Chains Ld. .. .. —
Worsley-Mesnes Ironworks Ld. —
Wragg, Thos. & Sons (Sheffield) Ld. .. .. .. —

Yeadon, Son & Co. Ld .. 8



Our photograph is used by courtesy of Tothill Press Ltd. It was an impressive part of the plant they were illustrating.

The PROOF of a screen lies in its efficiency

Here is a Niagara Vibratory Screen at work continuously delivering an accurately graded, clean and thoroughly washed product exactly to specification. It is pleasing its owners by the quality of its output and by its gratifying and very economic costings. It is working here on a large stationary plant, handling material under water sprays, but, whatever the duty, the Niagara Vibratory Screen operates with the highest possible standard of grading efficiency at a high rate of output.

Ask us to demonstrate and prove our claims for Niagaras

Telephone: Enfield 6622 (4 lines)

NIAGARA SCREENS AND PLANT LTD.

STRAYSFIELD ROAD, CLAY HILL, ENFIELD, MIDDLESEX.

STEEL CASTINGS

Produced by Electric Arc Process and Modern Plant

For - -

Rolling Mills - Melting Plants - Engineers, etc.

★

We can supply MACHINED when required

W. SHAW & Co. Ltd.

WELLINGTON STEEL FOUNDRY

MIDDLESBROUGH

Telephone: 3441 (P.B.X.)

Telegrams: Wellington, Middlesbrough

NEW AND SECOND HAND

RAILS

OF ALL SECTIONS

POINTS · CROSSINGS · SLEEPERS

TIMBERS · RAIL FASTENINGS · CHAIRS

PORTABLE RAILWAY AND TIP WAGONS

CHOCKWOOD

CIVIL ENGINEERING AND CONTRACTORS' SUPPLIES

S/H SAWN TIMBER A SPECIALITY

S. RHODES CO. LTD.

Telephone: 41327-9

BRIGHTSIDE LANE SHEFFIELD 9

Telegrams: 'RODESCO' SHEFF.

DEPOTS (SHEFFIELD) MILLRACE, BROUGHTON LANE, ECCLESFIELD. (LIVERPOOL) KNOTTY ASH.

INDEX TO ADVERTISERS

Adamson Alliance Co. Ltd. .. —
Aerex Ltd. 18
Allen, Edgar & Co. Ltd. .. —
Allen, W. G., & Sons (Tipton) Ltd. .. .. —
Allen West & Co. Ltd. .. —
Allis-Chalmers (Great Britain) Ltd. .. .. —
Anchor Chain Co. Ltd. .. —
Anderson, Boyes & Co. Ltd. .. 1
Angus, Geo. & Co. Ltd. .. —
Appleby-Frodingham Steel Co. .. .. —
Armstrong-Whitworth (Metal Industries) Ltd. .. .. —
Armytage & Sons Ltd. .. —
Arrol, Sir Wm. & Co. Ltd. .. —
Ashmore, Benson, Pease & Co. Ltd. .. .. —
Ashworth, E. & A. Ltd. .. —
Associated British Machine Tool Makers Ltd. .. .. —
Associated Electrical Industries Ltd. (Electronic Apparatus Division) .. —
Associated Electrical Industries Ltd. (Heavy Plant Division) .. .. .. —
Associated Electrical Industries Ltd. (Instrumentation Division) .. .. .. —
Associated Electrical Industries Ltd. (Motor & Control Gear Division) .. —
Associated Electrical Industries Ltd. (Switchgear Division) .. .. .. —
Associated Electrical Industries Ltd. (Traction Division) —
Associated Electrical Industries Ltd. (Transformer Division) .. .. .. —
Associated Electrical Industries Ltd. (Turbine Generator Division) .. .. —
Atlas Copco (G.B.) Ltd. .. —
Aurora Gearing Co. (Wilmot North) Ltd. .. .. .. —
Austin, Jas. & Sons (Dewsbury) Ltd. .. .. .. —
Auto-Klean Strainers Ltd. .. 49
Automatic Coal Cleaning Co. Ltd. .. .. —
Aveling-Barford Ltd. .. —

Bagnall, W. G. Ltd. .. .. —
Bairds & Scottish Steel Ltd. .. —
Barker, Davies & Co. .. —
Barlow & Chidlaw Ltd. .. —
Barnes & Bell Ltd. .. —
Barrow Ironworks Ltd. .. —
Bathgate, Richard A. .. —
Bayliss, Jones & Bayliss Ltd. —
Beckett & Anderson Ltd. .. —
Becorit (G.B.) Ltd. .. .. —
Beldam Asbestos Co. Ltd. .. —
Belliss & Morcom Ltd. .. —
Belmos Co. Ltd. .. .. —
Beresford, Jas. & Son Ltd. .. —
Birkett, Billington & Newton Ltd. 47
Biriec-Efco (Melting) Ltd. .. —
Birtley Engineering Ltd. .. —
Blacks Mining Equipment .. —
Blandford-Gee Cementation Co. Ltd. .. .. .. —
Blantyre Engineering Co. Ltd. —
Bolton Gate Co. Ltd. .. —
Bonser Tristram Ltd. .. —
Boyles Bros. Drilling Co. Ltd. 12
Bradley, J. & Co. (Stourbridge) Ltd. .. .. —
Bradley Pulveriser Co. Ltd. .. —
B.R.D. Co. Ltd. .. .. —
Brightside Foundry & Engineering Co. Ltd. .. .. —
British Belting & Asbestos Co. Ltd. .. .. .. —
British Electrical Repairs Ltd. —
British Iron and Steel Federation .. .. —
British Jeffrey Diamond Ltd. —
British Nylon Spinners Ltd. .. —
British Oxygen Co. Ltd. .. —
British Paints Ltd. .. .. —
British Resistor Co. Ltd. .. —
British Rollmakers Corporation Ltd. 24
British Ropeway Engineering Co. Ltd. .. .. .. —
British Steam Specialties Ltd. —
British Timken Division of the Timken Roller Bearing Co. 66
Broadbent, Thos. & Sons Ltd. —
Brown, David Corporation (Sales) Ltd. .. .. —
Brush Electrical Engineering Co. Ltd. 6
Brymbo Steel Works Ltd. .. —
B.T.R. Industries Ltd. .. —
Buell Ltd. .. .. .. —
Burnand, W. E. & Son Ltd. .. —
Burnside, George Ltd. .. 60
Burtonwood Eng'g. Co. Ltd. .. —
Bushing Co. Ltd. .. .. —

Cable Belt Ltd. .. .. —
Calomax (Engineers) Ltd. .. —
Carblox Ltd. .. .. .. —
Cascade Water Coolers Ltd. .. —
Case, J. I. Co. Ltd. .. .. —
Cast Basalt Products Ltd. .. —
Ceag Ltd. .. .. .. —
Cementation Co. Ltd. .. —
Chloride Batteries Ltd. .. —
Churchill Machine Tool Co. Ltd. —
Clarke, Chapman & Co. Ltd. .. —
Clark, Geo. & North Eastern Marine (Sunderland) Ltd. .. —
Clayton Equipment Co. Ltd. .. —
Cleveland Bridge & Engineering Co. Ltd. .. .. —
Cohen Bros. (Electrical) Ltd. —
Cohen, Geo. Sons & Co. Ltd. —
Colvilles Ltd. .. .. .. —
Conflow Ltd. .. .. .. —
Consett Iron Co. Ltd. .. 22
Consolidated Pneumatic Tool Co. Ltd. 16
Cooke, Troughton & Simms Ltd. —
Cooper, Jas. Milne & Co. Ltd. —
Cooper Roller Bearings Co. Ltd. —
Coppee Co. (Gt. Britain) Ltd. —
Cotterill, Herbert Ltd. .. —
Coulson, M. & Co. Ltd. .. —
Courtaulds Ltd. .. .. —
Cowlishaw, Walker & Co. Ltd. —
Cox & Danks Ltd. .. .. —
Crawley Industrial Products Ltd. .. .. .. 20 & 21
Cripps, R. & Co. Ltd. .. 19
Croda Ltd. .. .. .. —
Crofts (Engineers) Ltd. .. —
Crompton & Harrison Ltd. .. —
Crompton Parkinson Ltd. .. 32
Crone & Taylor Ltd. .. .. —
Crushing, Screening & Engineering Ltd. .. .. —
Curtis, A. L. (Onx) Ltd. .. 61

Davenport Engineering Co. Ltd. .. .. —
Davey, Paxman & Co. Ltd. .. —
Davis, John & Son (Derby) Ltd. .. .. —
Davy & United Engineering Co. Ltd. 2
Davy & United Instruments Ltd. .. .. .. —
Davy & United Roll Foundry Ltd. .. .. —
Dawson & Downie Ld. .. —
Demag A.G. .. .. .. —
Demolition & Construction Co. Ltd. .. .. .. —
Denison, Samuel & Sons Ltd. —
Distington Engineering Co. Ltd. .. .. —
D.M.M. (Machinery) Ltd. .. —
Dobson, W. E. & F. Ld. .. —
Dollery & Palmer Ltd. .. —
Donkin, Bryan Co. Ltd. .. 31
Dorman Long & Co. Ltd. .. —
Dougall, James & Sons Ld. .. 51
Dowty Mining Equipment Ld. —
Dunlop Rubber Co. Ld. .. —
Dust Suppression Ld. .. —

Eagre Construction Co. Ld. .. —
Edge & Sons Ld. .. .. —
Eickoff, Gebr. .. .. —
Elmco (Gt. Britain) Ld. .. —
Elastic Rail Spike Co. Ld. .. —
Elcordia Ld. .. .. .. —
Electrical Development Association .. .. —
Electric Furnace Co. Ld. .. —
Electroflo Meters Ld. .. —
Electro-Hydraulics Ld. .. —
Ellis, A. & Sons (Wakefield) Ld. .. .. —
English Drilling Equipment Co. Ltd. .. .. .. —
English Electric Co. Ld. .. —
English Steel Corporation Ld. —
Evans, Joseph & Sons (Wolverhampton) Ld. .. .. —
Ewart Chainbelt Co. Ld. .. 56

Fearnehough, W. Ld. .. —
Felco Hoists Ld. .. .. —
Fenner, J. H. & Co. Ld. .. 29
Fielding & Platt Ld. .. —
Finlay Engineering Co. Ld. .. —
Firth, Thos. & John Brown Ld. —
Firth-Vickers Stainless Steels Ld. .. .. —
Fisher & Ludlow Ld. .. —
Flame Hardeners Ld. .. —
Fletcher, Geo., Ld. .. .. —
Follsain-Wycliffe Foundries Ld. .. .. —
Foraky Boring & Shaft Sinking Co. Ld. .. .. —
Forster, T. S., & Sons Ld. .. —
Foster, H. Johnson, Ld. .. —
Foster, Henry & Co. Ld. .. —
Foundry Services Ld. .. —
Fowler, John & Co. (Leeds) Ld. .. .. —
Fuel & Metallurgical Processes Ld. 38
Fullerton, Hodgart & Barclay Ld. .. .. —

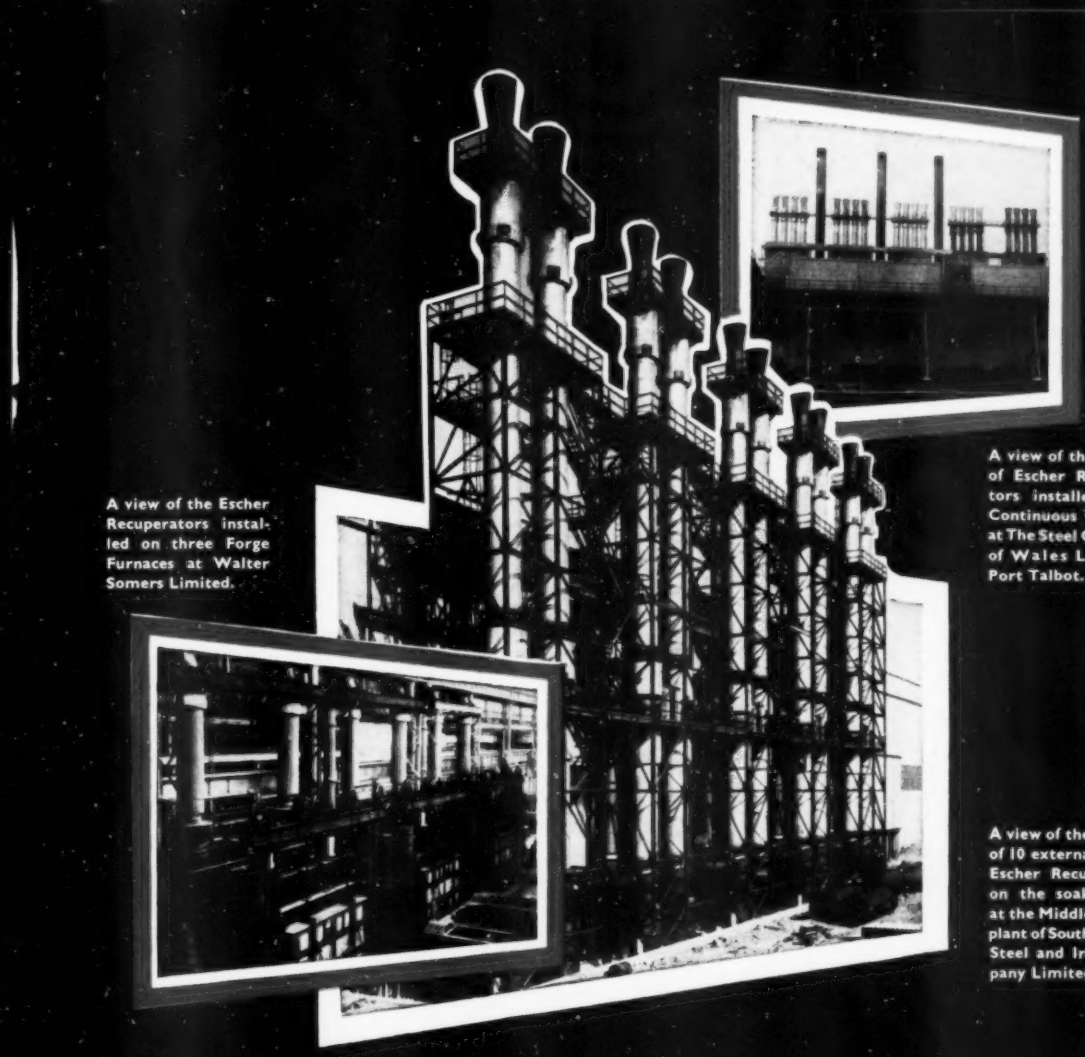
Gas Council .. .. .. —
General Electric Co. Ld. .. 3
General Refractories Ld. .. —
Gent & Co. Ld. 8
Gibbons Bros. Ld. .. .. —
Gibbons (Dudley) Ld. .. —
Glover Bros. (Mossley) Ld. .. —
Glover, Wm. Jas. & Co. Ld. .. —
Goodall, Clayton & Co. Ld. .. 53
Goodyear Tyre & Rubber Co. Ld. 44
Green, E. & Sons Ld. .. —
Green, Horace, & Co. Ld. .. —
Greening, N. & Sons Ld. .. —
Guest, Keen Iron & Steel Works 40
Gullick Ld. 45
Gutehoffnungshutte Sterkrade —

Hackbridge & Hewittic Electric Co. Ld. .. .. —
Hadfields Ld. .. .. —
Halesowen Steel Co. Ld. .. —
Hall Bros. (West Bromwich) Ld. .. .. .. —
Hallamshire Steel Co. Ld. .. —
Hanmade Conveyor Co. Ld. .. —
Hardman, E. Son & Co. Ld. .. —
Harland Engineering Co. Ld. 61
Harlow, Robt. & Son Ld. .. —
Harvey, G. A. & Co.(Ldn.) Ld. 13
Hastie, Bernard & Co. Ld. .. —
Hatchett & Co. Ld. .. .. —
Hayden-Nilos Ld. .. .. —
Head, Wrightson & Co. Ld. .. —
Head, Wrightson Minerals Engineering Ld. .. .. —
Head, Wrightson Machine Co. Ld. .. .. —
Head, Wrightson Teesdale Ld. .. .. —
Heap, Joshua & Co. Ld. .. —
Heeley (Mining Machinery) Co. Ld. .. .. .. —
Hick, Hargreaves & Co. Ld. .. —
Hill, Richard Ld. .. .. —
Hills (West Bromwich) Ld. .. —
Holman Bros. Ld. .. .. —
Holmes, W. C. & Co. Ld. .. 9
Holroyd, John & Co. Ld. .. —
Honeywell Controls Ld. .. —
Hopkinson, A. & Co. Ld. .. —
Hornsby & Goodwyn Ld. .. 60
Hoy, Austin & Co. Ld. .. —
Hudswell, Clarke & Co. Ld. .. —
Humber Graving Dock and Engineering Co. Ld. .. —
Hunslet Engine Co. Ld. .. —
Huntington, Heberlein & Co. Ld. 15

Iliffe Books Ld. .. .. —
Imperial Chemical Industries Ld. .. .. —
Incandescent Heat Co. Ld. .. —
International Combustion Products Ld. .. .. —
International Construction Co. Ld. 26
International Harvester Co. of Great Britain Ld. .. —
Intrafor Mining Engineers Ld. .. .. —

(*Continued on page 62*)

Published by the Proprietors, INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LIMITED, John Adam House, 17/19, John Adam Street, London, W.C.2, and Printed in Great Britain, by HARRISON & SONS, LIMITED, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.



A view of the Escher Recuperators installed on three Forge Furnaces at Walter Somers Limited.

A view of the line-up of Escher Recuperators installed on 5 Continuous Furnaces at The Steel Company of Wales Limited, Port Talbot.

A view of the battery of 10 externally sited Escher Recuperators on the soaking pits at the Middlesbrough plant of South Durham Steel and Iron Company Limited.

Nearly 1,000 Escher Recuperators

—by turning waste heat into preheat—

are cutting the cost of world steel production

S&A Escher Recuperators—accept gases at full furnace temperature: provide high preheat temperatures for air and gas: incorporate automatic safeguard against overheating: include a simple and tight damper system without leakage or loss of draught: eliminate the need for a separate chimney or excavations: have no "hot spots": are of such a configuration as to prevent slag or dust deposits: provide easy access to all parts making for low maintenance costs. These advantages combined with Escher reliability explain the continuing demand. May we visit you to also discuss the Hollow Fin Escher Recuperator?

S A

Stein & Atkinson Ltd.

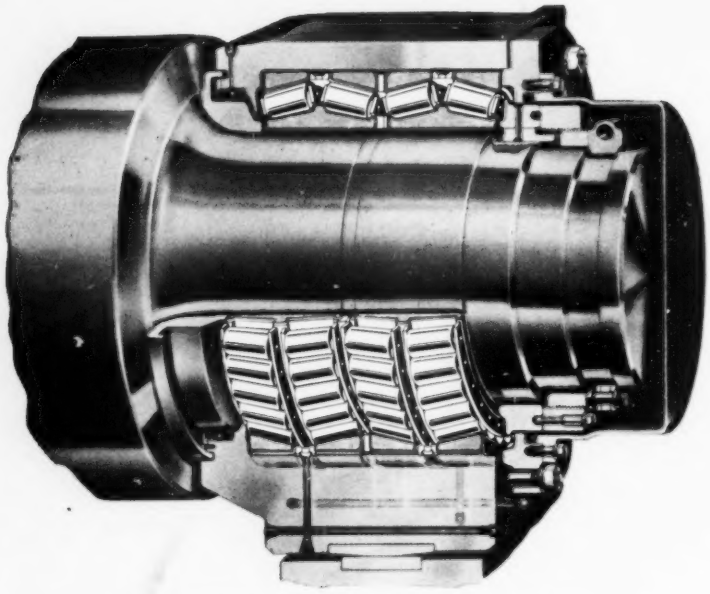
Westminster House Kew Road Richmond Surrey

FURNACE ENGINEERS

IRON & COAL

THE IRON AND COAL TRADES' REVIEW

VOL. 183 — Offices: John Adam House, 17-19, John Adam Street, London, W.C.2. — Registered as a Newspaper.
No. 4,859 — LONDON: FRIDAY, SEPTEMBER 1, 1961 — Single copies 1s. By post 1/4. Ann. Subn.: 52s. (Abroad 60s.)



UNSURPASSED
IN THE MOST ARDUOUS
ROLLING MILL DUTIES

British Timken, Duston, Northampton, Division of The Timken Roller Bearing Company. Timken bearings manufactured in England, Australia, Brazil, Canada, France and U.S.A.

TIMKEN®

REGISTERED TRADE-MARK

tapered roller bearings